The UNESCO Courier

A window open on the world

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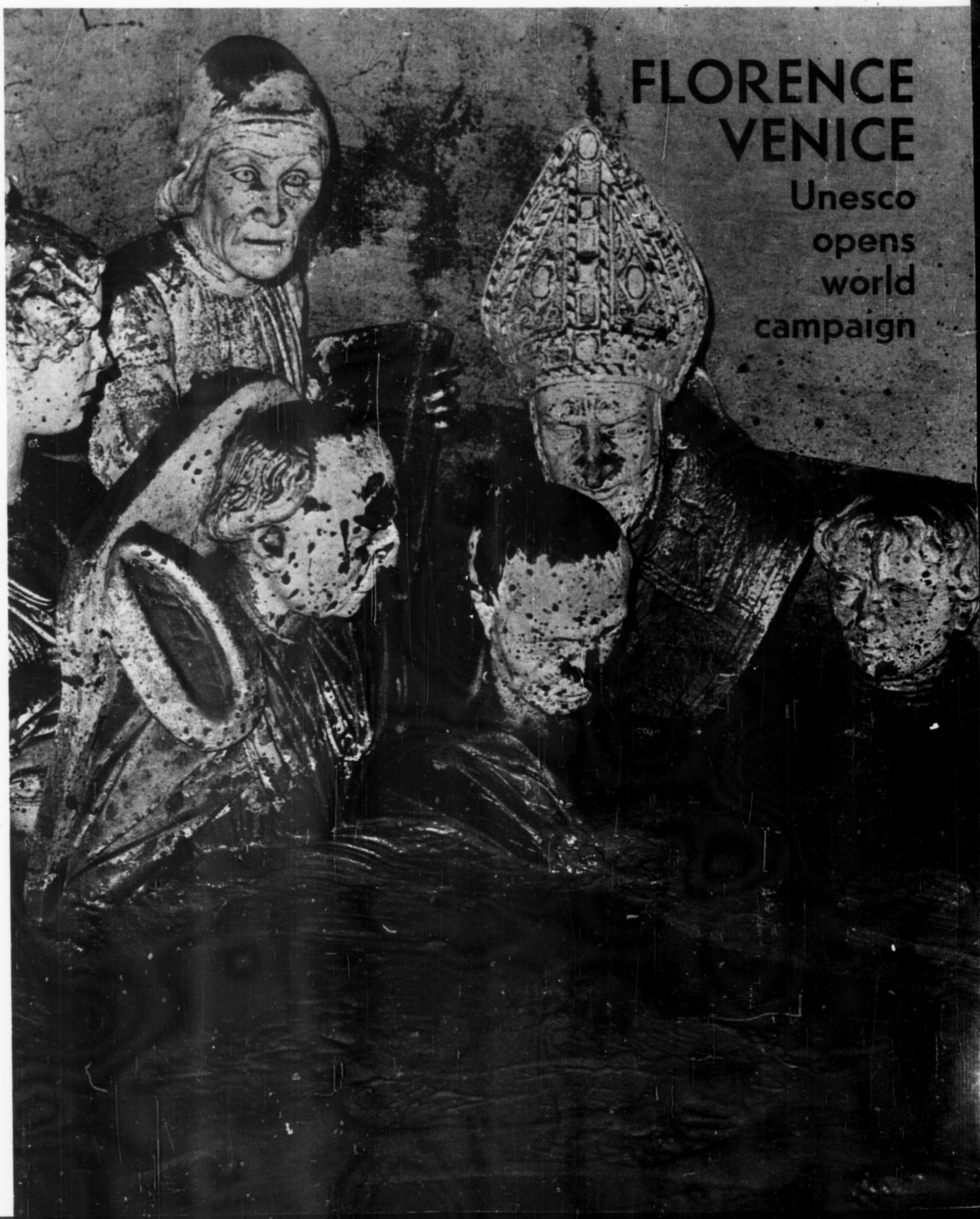

FLORENCE VENICE

Unesco opens world campaign

Photo © Unesco

TREASURES
OF
WORLD ART

12

Adam and Eve spared by the flood

The only existing works of Masaccio, one of the great Florentine painters of the early 15th century, are his frescoes in the Brancacci Chapel of the Carmelite Church in Florence. These works were spared by the recent flood that ravaged Florence. Masaccio died in 1428 at the age of 27. But the masterpieces he produced in his short life mark him as the true creator of Renaissance painting. Above, detail of Masaccio's "Adam and Eve driven out of Paradise".

From "Masaccio: Frescoes in Florence", published by the New York Graphic Society, by arrangement with Unesco, in the Unesco World Art Series (1956); 32 full colour plates.

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The international campaign for Florence and Venice

Special issue

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Adam and Eve *(Masaccio)*

N° 1 - 1967 MC 66-1-220 A

Photo Soprintendenza alle Gallerie, Florence

Cover photo

The Uffizi in Florence is one of the world's most celebrated museums. Last November invading floodwaters wrought havoc in its basement where innumerable works of art from the museum's reserve collections are stored. Here, after the waters had subsided, some of these works lie half submerged in mud.

FOR FLORENCE AND

The appeal launched on December 2, 1966 by

RENÉ MAHEU Director-General of Unesco

at the opening of the International Campaign for Florence and Venice

During the first days of November, Tuscany and Venetia were devastated by floods of extraordinary magnitude and violence. The damage has been enormous. To the toll in human lives and the loss of property were added the destruction, in Florence and Venice, of creations of the human spirit which made the enchantment of the culture and art of living that Italy has given to the world.

In all, 885 works of art of the first importance, eighteen churches and some 10,000 other objects have suffered. Seventy libraries and learned institutions have been stricken. More than 700,000 volumes of archives comprising some 50 million items, of which 10,000 were of inestimable historical and scientific value, have been damaged.

Florence and Venice! The names alone say why Italy's grief is ours. But they indicate also why Italy's resolution to preserve and restore everything that can be saved will be the common purpose of us all. Venice sinking into the waters, it is as if one of the most radiant stars of beauty were suddenly engulfed; Florence bemired, it is the springtime of our hearts which is for ever disfigured. We will not resign ourselves to such disasters.

The General Conference of Unesco, which has just concluded its fourteenth session, has decided unanimously to issue an urgent appeal "to the spirit of fellowship of Member States to assist, to the fullest extent of their means, the efforts of the Italian people and authorities to preserve and restore cultural property that has been or is in danger of being damaged".

In so doing, Unesco in no way wishes to take the place of the aid and co-operation, public and private, which Italy's innumerable friends throughout the world have spontaneously offered and are prepared to furnish directly. The brotherhood of man that the international agencies seek to promote and to organize is nurtured by the living springs of natural and historic friendships between persons and peoples.

But Unesco, called upon by its Constitution to assure "the conservation and protection of the world's inheritance of books, works of art and monuments of history and science" can, as the Italian Government has requested, assemble and distribute information regularly on the needs, on the one hand, and offers of aid on the other. In this way outside assistance may be best directed by stages, in agreement with the Italian authorities, to meet the needs and fit the possibilities of the situation.

Most important, Unesco can stimulate international solidarity—and that indeed should be its rôle. Just six years ago, from this very platform, my predecessor launched a pressing appeal to the world to save the monuments of Egyptian and Sudanese Nubia which were threatened to be flooded as a result of the construction of the Aswan High Dam. Fifty countries responded to that appeal. Today it can be said that the safeguarding of the antiquities of Nubia is accomplished or assured, including the unique monumental ensemble of Abu Simbel. I am sure that once again mankind will not fail to acknowledge and act to save its common heritage, thereby acknowledging again and reaffirming its profound spiritual unity.

VENICE

ON behalf of the United Nations Educational, Scientific and Cultural Organization, I address a solemn appeal to the intellectual and moral solidarity of mankind for the preservation and restoration of the damaged cultural treasures of Florence and Venice.

- I call upon the 120 Member States of Unesco, and first of all upon their governments, to give generous aid in the form of money, equipment and services to carry out this immense task of preservation and restoration which will require several years.

- I call upon museums, libraries, archives and learned institutions in all the countries to put their experts, their laboratories and their workshops at the disposal of the corresponding Italian institutions whose installations and collections have suffered. I call upon those international organizations of specialists which are closely associated with Unesco's work in this field—the International Council of Museums, the International Council on Monuments and Sites, and the International Federation of Library Associations and the International Council on Archives—to promote and co-ordinate efforts in this respect.

- I call upon the writers, artists, musicians, critics and historians, indeed all those—and they are legion—whose works have been inspired by the treasures of Florence or Venice, to donate a part of what they have gained—they know better than anyone else that they can never repay their true debt, which is a spiritual one—and to help us with their talents in reaching the public.

- I call upon museums, art galleries, theatres, and concert halls, foundations and private collections, which glory in the works we owe to the genius of Florence and Venice, to organize exhibitions, performances, and other events, devoted to Florence and Venice, the proceeds of which would go to the Funds that have been set up in many countries, and by Unesco itself, to receive voluntary financial contributions.

- I call on the millions and tens of millions of persons who have visited these famous cities, even if only once, and who have returned enriched for the rest of their lives, to send one dollar—or whatever they can—to Unesco.

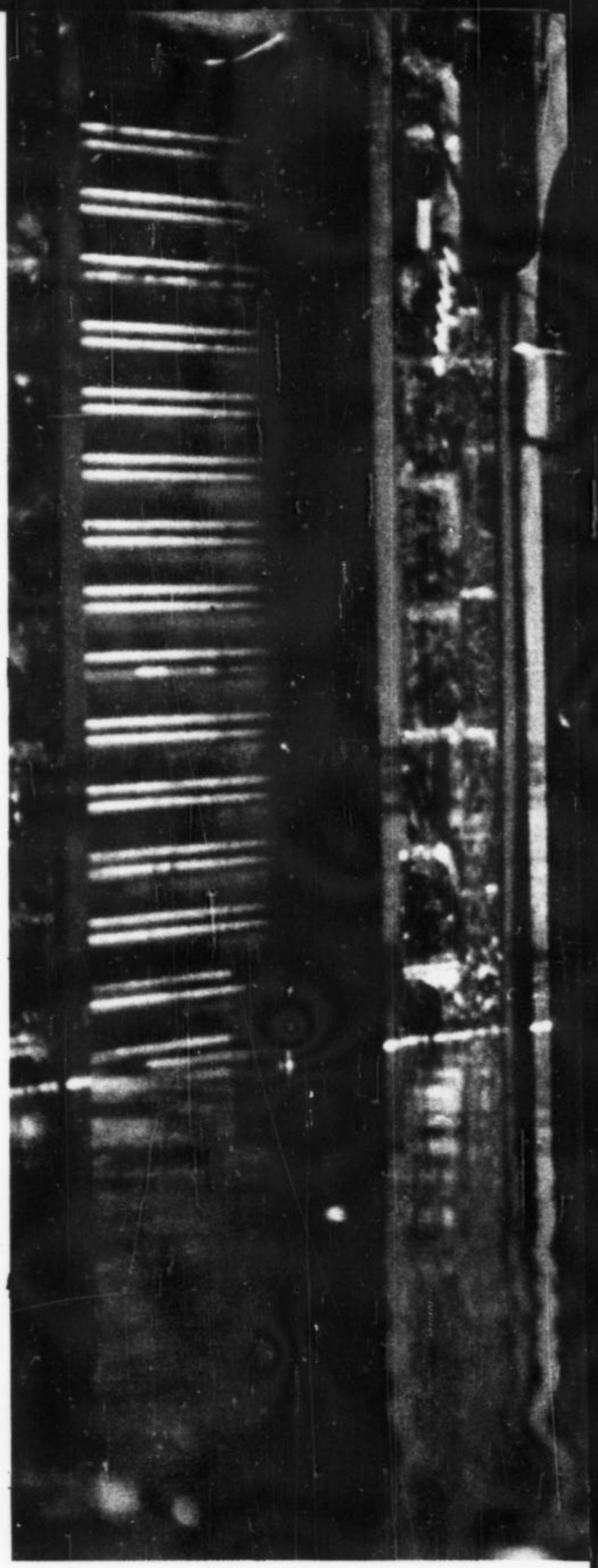
- Finally, I also call on all those who have never been to Florence or Venice, and many of whom may never have that chance, to contribute something: be it money or work—something of themselves.
Each one of us knows himself to be a member of the family of Man.
How then could any one of us remain indifferent to the fate of these most precious jewels of our common human heritage?

Photo © Epoca - Giorgio Lotti

Years to repair the damage

by Bruno Molajoli

Photo © Epoca - Sergio del Grande, Milan



Smashed cars hurled into a heap by the violence of the Florence floods lie outside the church of Santa Croce (left). Six metres (20 ft.) of water invaded the church's famous museum. Right, wading through a Florence street as waters began to recede on the evening of November 4.

DURING the first anxious days, those in my country stricken by the sudden violence of the floods had to stifle their distress and devote all their efforts to the immense task of rescue and protection. At that time, the sympathy shown by the whole world stirred feelings of deep gratitude, encouragement and hope in Italy.

In Tuscany and Venetia, two regions which are among the richest in monuments and works of art, the toll of

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Photo © Epoca - Giorgio Lotti, Milan

damage and destruction is immense, particularly in Florence and Venice, though other important historical centres have also been hit in varying degrees.

In Venice it has been found that the most precious works of art (sculptures and paintings) in the museums and churches have escaped injury. But very serious damage—much of it irreparable—has been caused to the libraries (including the historically important Biblioteca Marciana), the Giorgio Cini Foundation, archives and art collections, art and antique shops.

The chief cause for alarm in Venice is the state of monuments, churches and *palazzi* in the picturesque old parts of the city. Water polluted with fuel oil from tanks replenished for the winter has risen several metres and seriously defaced and fouled these buildings. Their restoration will be long and difficult.

Great anxiety is also felt about the stability of many important historic buildings—already in a precarious state—and in fact of the entire city. The surge of the floodwaters placed abnormal stresses on old walls already weakened by constant dampness and on their foundations which, as is well known, rest on piles. (See Unesco Courier, January 1965).

The most immediate problems are those of inspection and of carrying out the necessary reinforcement and restoration operations. We fear that there are unpleasant surprises in store for us here.

Venice's old ills have become more acute, thus making us better aware of the price which has to be paid for its beauty.

The situation calls for radical measures:

■ the movement of water in the lagoon must be controlled by making it independent of the tides in the Adriatic: this is an enormous undertaking but absolutely essential;

■ sufficient financial and technical resources must be made available for the restoration and maintenance of the monuments and the historic setting;

■ a new use as public and cultural buildings must be found for the main private *palazzi*, in order to save them from the threat and hence from the risk of being left derelict.

As for Florence, it is a city disfigured, an artistic heritage built up over long centuries of artistic fervour gravely damaged and in part lost forever because of the violence of the natural

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Dual threat to Venice

Venice has never been in greater peril. Last November, storm tides breached its protective walls, flooding the city to a depth of several feet (right) and exposing it to a powerful additional impact from the Adriatic. The Italian Government has earmarked nearly 40,000 million lire ($63 million) to help save the city. Venice is built on a foundation of old wooden piles (below) driven into the soft ground of several hundred tiny islands. The stability of its buildings is increasingly threatened by subsidence of the lagoon bed (see the "Unesco Courier", January 1965). Erosion from the surge of waters is also attacking the foundations and causing increasing damage to monuments, churches, palaces and other old buildings. An enormous programme of reinforcement and restoration throughout the city is needed, and also protection from the Adriatic tides.

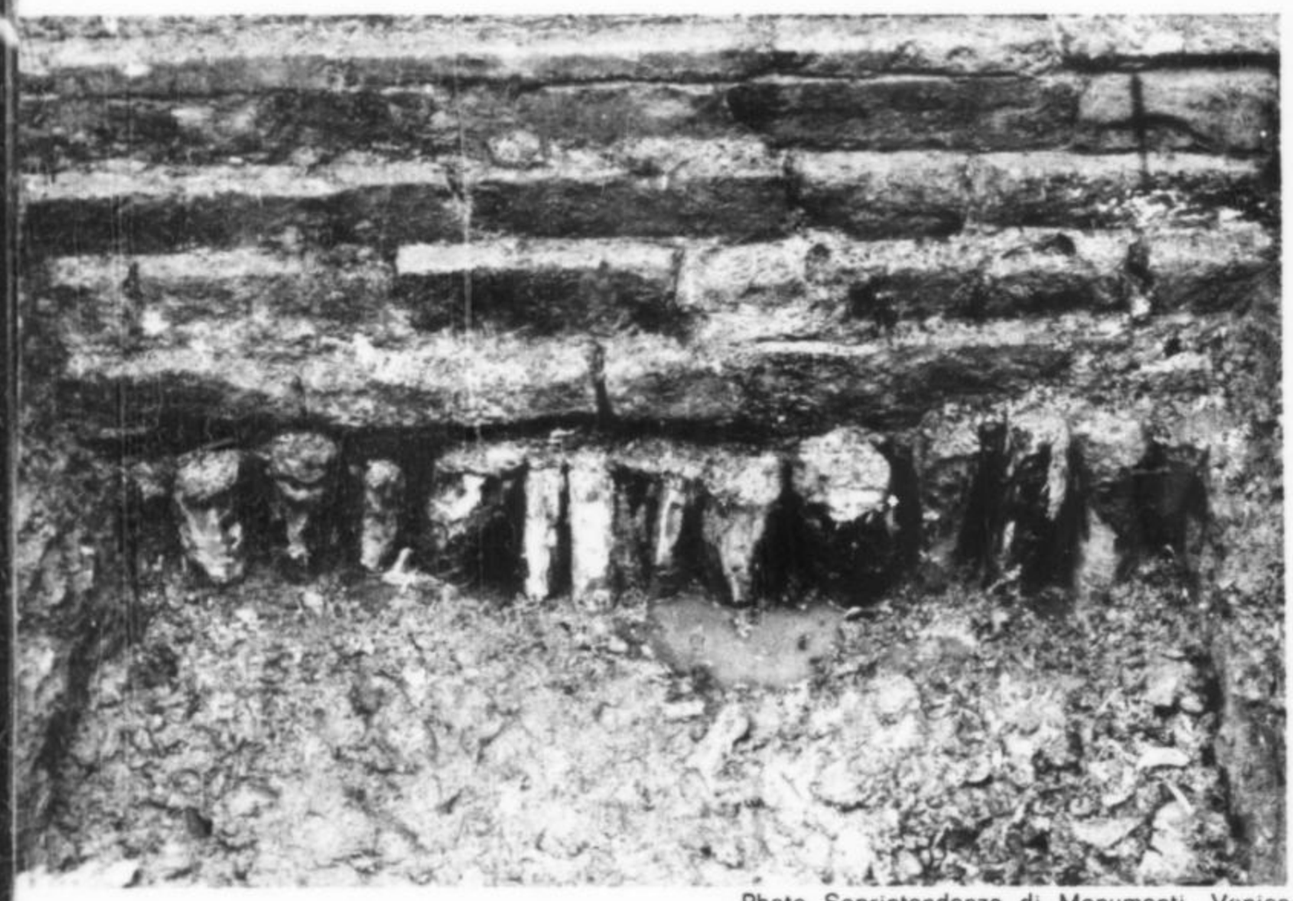

Photo Soprintendenza di Monumenti, Venice

TO REPAIR THE DAMAGE *(Continued)*

International aid from every continent

forces unleashed in the space of a few hours.

In the centre of Florence, 18 churches, with a wealth of works of art, were flooded with water and mud, their altars and ornaments overturned, their paving stones uprooted, the frescoes and paintings on wood—adornments which made them living museums—seriously damaged.

Many *palazzi* of historic interest—as well as museums and libraries—have been damaged. The picturesque shops of the Ponte Vecchio have been destroyed. The embankments of the Arno have been damaged and parts of them have collapsed.

The list of treasures affected by the flood is still incomplete. But it is known already that the following works of art, to take account of only the most famous, have been rescued from the water:

313 paintings on wood,
431 paintings on canvas,
11 series of frescoes,
39 individual frescoes,
31 frescoes which had been removed from their original settings,
14 groups of sculpture,
144 individual sculptures, including 22 wood carvings,
23 illuminated codices.

In all, more than 1,000 works of art of outstanding importance.

Considered by their respective periods, the damaged paintings include:

over 30 paintings of the 13th and 14th centuries, including works by Cimabue, Lorenzo Monaco, Lorenzetti, Bernardo Daddi, Giovanni del Biondo;

over 40 paintings of the 15th century, including works by Fra Angelico, Cosimo Rosselli, Lorenzo di Credi, Paolo Schiave, Domenico Veneziano, Neri di Bicci, Alessio Baldovinetti;

nearly 150 paintings of the 16th century, including works by the greatest artists of the age, from Bronzino to Vasari and from Cristoforo Allori to Poppi and Naldini.

To these must be added the loss of a quantity, yet to be established but certainly very great, of lesser works of art, church ornaments and vestments, and documents, which, together with the major works of art, created in Florence an incomparable atmosphere of artistic civilization.

Faced by this disaster, we have tried to provide for the most urgent

Photo © Camera - Foto, Venice

needs and to deal with the grave situation by every means possible.

We have been greatly touched by the offers of assistance, the personal contributions and the supplies of equipment which began to come in from all sides as soon as the first news of the disaster became known. Foreign museums, international institutions, Unesco's International Centre for the Study of the Preservation and Restoration of Cultural Property in Rome, and scholars and scientists in all countries have offered their support.

The emergency and the absolutely exceptional situation in the city of Florence made it impossible for us at the start to call on anyone except the people already on the spot. There is no doubt, however, that we shall need to take advantage of these exceptional offers in the future programme of work and we shall indeed be glad to count on them.

For the most pressing needs, the Italian Government has already allocated 4 thousand million lire (over $6.4 million) to save cultural property, as well as 1,300 million lire (over $2 million) for the University of Florence alone. But it can already be seen that these costs will have to be multiplied five-fold for the work of restoration to be undertaken over the next few years. For Venice, the government has added 9,000 million lire ($14.4 million) to the 30 thousand million lire ($48 million) already allocated to the preservation of the city.

Over sixty priority operations are at present in progress in the chief historic buildings of Florence and the surrounding area: they are being cleared out, the mud is being removed. shaken structures are being strengthened and technical studies in view of subsequent integral restoration work. are being carried out.

As regards works of art (paintings, sculptures, tapestries, ancient weapons, miniatures), priority has been given to their recovery and then to a preliminary clean-up; the main effort is being concentrated on fixing painted surfaces, which, where they have not already been lost, are all in great danger. This is an extremely delicate operation.

Fifty technicians sent from the main specialized laboratories in Italy (the Central Institute of Restoration at Rome, and the restoration workshops of Bologna, Milan and Naples) are now working in the Florence laboratories under the direction of the

CONTINUED ON NEXT PAGE

Photo © Rizzoli Press, Milan

Years to repair the damage

(Continued)

Superintendent of the Galleries of Florence, Professor Ugo Procacci and his immediate colleagues. Thanks to their courageous efforts in this difficult work, carried out with self-sacrifice and devotion, it has been possible to rescue a great part of this artistic heritage and return it to a state in which it can be saved.

Shifting one crate may be work for a handyman, but shifting a thousand crates becomes work for an engineer.

The restoration of a picture is always a delicate and complex operation; but we have to restore several hundred works of art simultaneously. This raises problems of unprecedented scope and complexity: co-ordination of research in each individual case; mobilization of technical resources; assessment of restoration costs, which will certainly be very high.

Even under the most favourable conditions, this immense artistic heritage cannot be quickly and fully restored. There are technical reasons why short cuts cannot be taken in certain operations. It is expected that several years will be required, certainly more than five.

Never before have we been faced with the need to operate on such an enormous scale, for so many works of art.

We have a long-term programme before us, involving much work and responsibility. We are ready to face it. We pledge ourselves to this task, for which we shall be responsible to the world of culture, convinced that it will continue to support us with its understanding, sympathy and co-operation as it has so admirably done up to the present.

Photo © Epoca - Giorgio Lotti, Milan

Florence after the deluge. Above, tattered and shapeless bundles of paper —the remains of a bookstore's stock. Left, plodding through oil-polluted water, people recuperate a few household goods and personal belongings. In foreground, oil-coated books and paintings. Below, between the Cathedral (Duomo) and the Baptistery, chairs and benches are stacked in street while first aid is given to damaged art in these churches.

Photo © Epoca - Giorgio Lotti, Milan

In the Piazza della Signoria, littered with debris, the famous statues of Hercules (right) and David (left)—a marble copy of Michelangelo's famous work—still flank the main entrance to the Palazzo Vecchio. Third statue (background) surmounts the great fountain of Neptune. Statue casualties loaded in truck (foreground) are being taken to a restoration studio.

Photo © Epoca - Giorgio Lotti, Milan

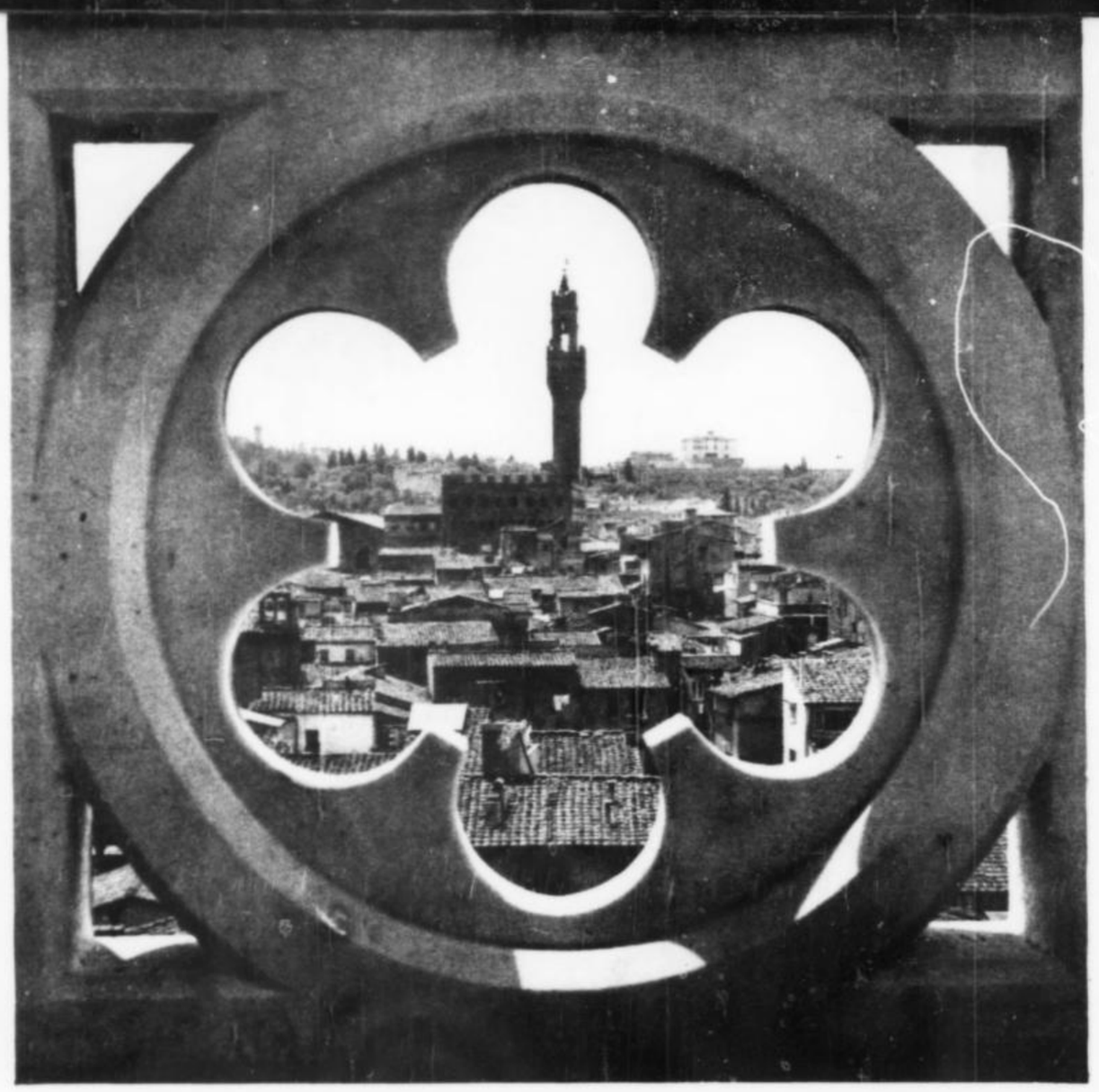

Photo © Robert Descharnes. From "Florence que j'aime" (The Florence I love) by Carlo Coccioli, Editions Sun, Paris

Against its background of cypress-covered hills, the tower of the Palazzo Vecchio has overlooked the roofs of Florence for six centuries (right). In the 15th century the city boasted some 60 square towers clustered around its central square, the Piazza della Signoria. Below, damage wrought by the flood on the Ponte Vecchio, the oldest bridge in Florence, and until the flood almost unchanged since 1345. It is flanked with goldsmiths shops, but many of these are now badly damaged and their stocks destroyed.

Photo © Reporters Associés

A stupendous edifice in white, green and red marble, the cathedral of Santa Maria del Fiore, the "Duomo", stands in the heart of Florence (right). Begun in 1296 under the direction of Arnolfo di Cambio, the work was continued by Giotto, Andrea Pisano and Francesco Talenti. In 1417 Brunelleschi designed the cupola—the Duomo—which has given its name to the entire cathedral. The building did not escape the flood waters, which ruined two organs, the marble floor and a work by the 15th century Florentine painter Giovanni Balducci.

The plight of the Florentine artisans

FLORENCE is the treasure house of Renaissance art and thought, but it is also a treasure house of living people, people who are heirs to the traditions that were established when that grand creative upsurge of the human spirit had subsided. In and around Florence live some 7,000 artisans, men and women who fashion the objects which generations of visitors to Florence have been delighted to admire and to buy.

Working with the skills of centuries in his fingers and using tools that make mockery of machines, the Florentine artisan is unique. Yet some 6,000 of them have lost their all—tools, materials, workshops. Most of them are not young and it is feared that they will lack the resources to start again, painfully to reconstruct their shattered lives,

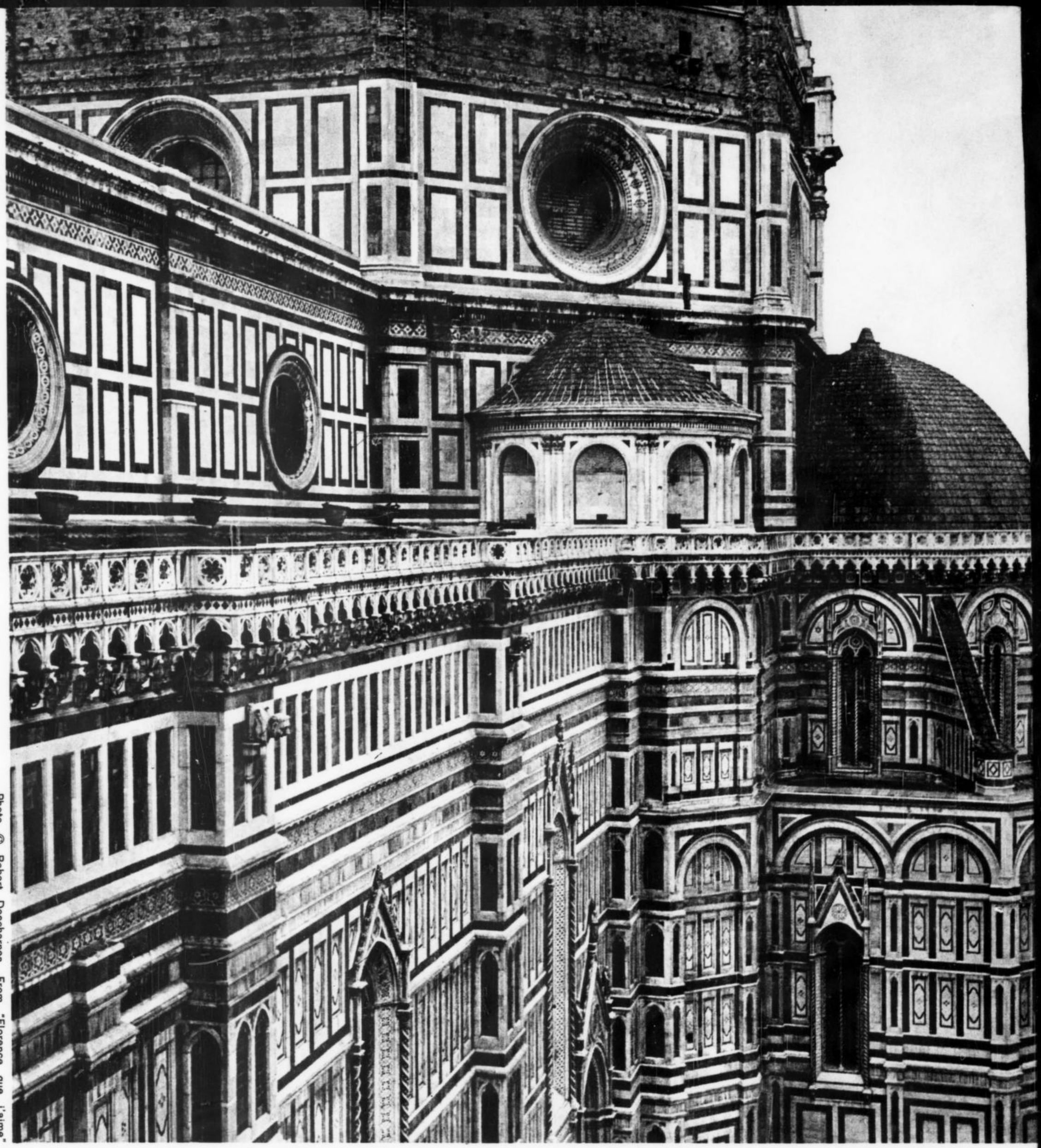

Photo © Robert Descharnes. From "Florence que j'aime" (The Florence I love), by Carlo Coccioli, Editions Sun, Paris

and instead will turn to other kinds of work for a livelihood. The world will be the poorer for their loss.

It was heartbreaking to wade through the byways of Florence and see the owners of the little shops for which Florence is celebrated struggling to put things to rights. Some, hopefully, displayed the pitiful remains of their stock, saturated and stained, for sale at rock-bottom prices in the hope of recovering a few lire to help start again. But more often than not the stuff was unsellable.

Some 6,000 of Florence's 10,000 shops have been destroyed. Thousands of families are homeless and those lucky enough to have ground-floor apartments still habitable are doomed to live for many months in rooms saturated with water and reeking of fuel oil. Many houses, undermined by the surging torrent of the flood have started to collapse and are shored up with great timbers.

Nevertheless, the work of clearing the streets of debris and mud is going ahead swiftly and methodically right through the night. Every little shop has its owner, sometimes alone, more often with helpers, busily scrubbing walls, repairing floors and hammering up counters and showcases, and every shop has in it a brazier or even a bonfire, to dry off the interior. Over all the rain pelts down as it has ceaselessly for weeks, perpetuating the slimy mud in streets and alleys and adding immeasurably to the discomfort of the shaken city. And over everything, in every building, in every street, a dank humidity and the acrid tang of fuel oil.

REX KEATING

DIMENSIONS OF A DISASTER

Photo Reporters Associés, Paris

Fifteen hundred paintings were damaged in Florence alone. An emergency "hospital" has been opened for these flood-damaged masterpieces in the huge building that normally houses the unique collection of lemon trees of the Palazzo Pitti. The building, 120 metres long by 10 metres high (400 ft. by 30 ft.), has been transformed into a vast insulated chamber equipped with furnaces and air blowers. Paintings on wood which demand a long and delicate treatment are set on wooden tables and sprayed with special disinfecting gas to kill mould. Above, "Noli me tangere", a celebrated work by Pontecormo (1531) based on a sketch by Michelangelo. It was preserved in the Casa Buonarroti (Michelangelo's home). Except for a hand, the figure of Christ has been completely effaced (right of photo). A city set on the hills in background has almost vanished. Left, works in marble, bronze and ceramic from a museum storeroom after rescue from the mud.

The list which follows of artistic and cultural casualties suffered by the city of Florence alone is necessarily incomplete. It will be months, perhaps years, before a detailed and definitive assessment can be made of the losses.

MUSEUMS AND GALLERIES

MUSEO ARCHEOLOGICO. Thirty-four ground-floor rooms, including Etruscan topographical museum, invaded by floods. Floors burst open, glass cases demolished and exhibits buried in mud. Over 9,000 vases and other valuable relics, including many objects in bronze and other metals, await cleaning and restoration. In restoration studio, equipment and objects being restored, including six painted Egyptian sarcophagi, badly damaged. Photographic studio equipment destroyed and records damaged.

MUSEO BARDINI. Entire ground floor flooded. Celebrated collection of musical instruments (16th to 19th centuries) gravely damaged. Large wooden model by Gherardo Silvani (project for church of St. Firenze), "Madonna" by Cranach and a "Hercules" painted by Domenico Beccafumi all severely damaged.

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DIMENSIONS OF A DISASTER *(Cont'd)*

MUSEO BARGELLO. Four metres (13 ft.) of water in exhibition room of Michelangelo sculptures submerged and stained these works. Three terracotta figures by Tribolo, another by Vincenzo Danti and the bronze "Samson and the Philistine" by Perino da Vinci all broken. Courtyard sculptures by Ammammati and Giovanni Bologna stained by oil and water. Valuable collection of armour and weapons damaged.

CASA BUONARROTI. Ground floor flooded up to the vault. All works on this level suffered. Two paintings by Bronzino and Battista Franco almost ruined. The collection of portraits of Michelangelo (including the well-known one by Bugiardini), and the "Two Lovers" attributed to Titian immersed and covered with mud. Some della Robbia statuettes broken. Recently discovered "Crucifix" by Michelangelo unharmed.

CONSERVATORIO CHERUBINI. In the library, two shelves of autograph and in part unpublished musical manuscripts (16th to 19th centuries), including the "Fondo Pitti", and unpublished manuscripts by Rossini flooded and bemired. Much of this material may still be saved. Collection of musical instruments, including works by Stradivarius, was fortuitously saved, having been temporarily moved upstairs.

MUSEO DELL' OPERA DEL DUOMO. Over 100 statues covered with mud and oil. Unique collection of models for construction of cathedral and Brunelleschi's model for its dome severely damaged by upthrust of air and water under floor. Over 6,000 volumes of ancient archives in basement damaged plus 55 illuminated Renaissance musical codices.

MUSEO DI STORIA DELLA SCIENZA. Many collections of inestimable value engulfed by mud. Collections of ancient clocks, alembics, scales and scientific instruments (16th to 20th centuries), including Edison's phonograph, destroyed or seriously damaged.

MUSEO HORNE. This museum, presented to Florence by an English scholar and collector, Herbert Horne, was seriously damaged. Over four metres (14 ft.) of water and mud in ground floor and cellars. Among damaged works: a stucco attributed to Luca della Robbia; "Drunkenness of Noah" and a "Madonna" by Beccafumi; a "Saint Sebastian" by Ferrarese; a "Madonna" by Begarelli; an "Adoration" by Bartolomeo di Giovanni; a school of Ghiberti stucco, "Madonna and Angels" (shattered); a bust by Matteo Civitali. One hundred volumes of archives (14th to 18th centuries) saturated and fine Renaissance furniture and woodwork partly destroyed.

MUSEO MEDICEO, PALAZZO RICCARDI. Oily water in ground floor flooded glass cases and damaged tapestries. Medici family portrait collection untouched except for "Duke Alessandro" by Vasari. The "Madonna" by Filippo Lippi was just clear of water.

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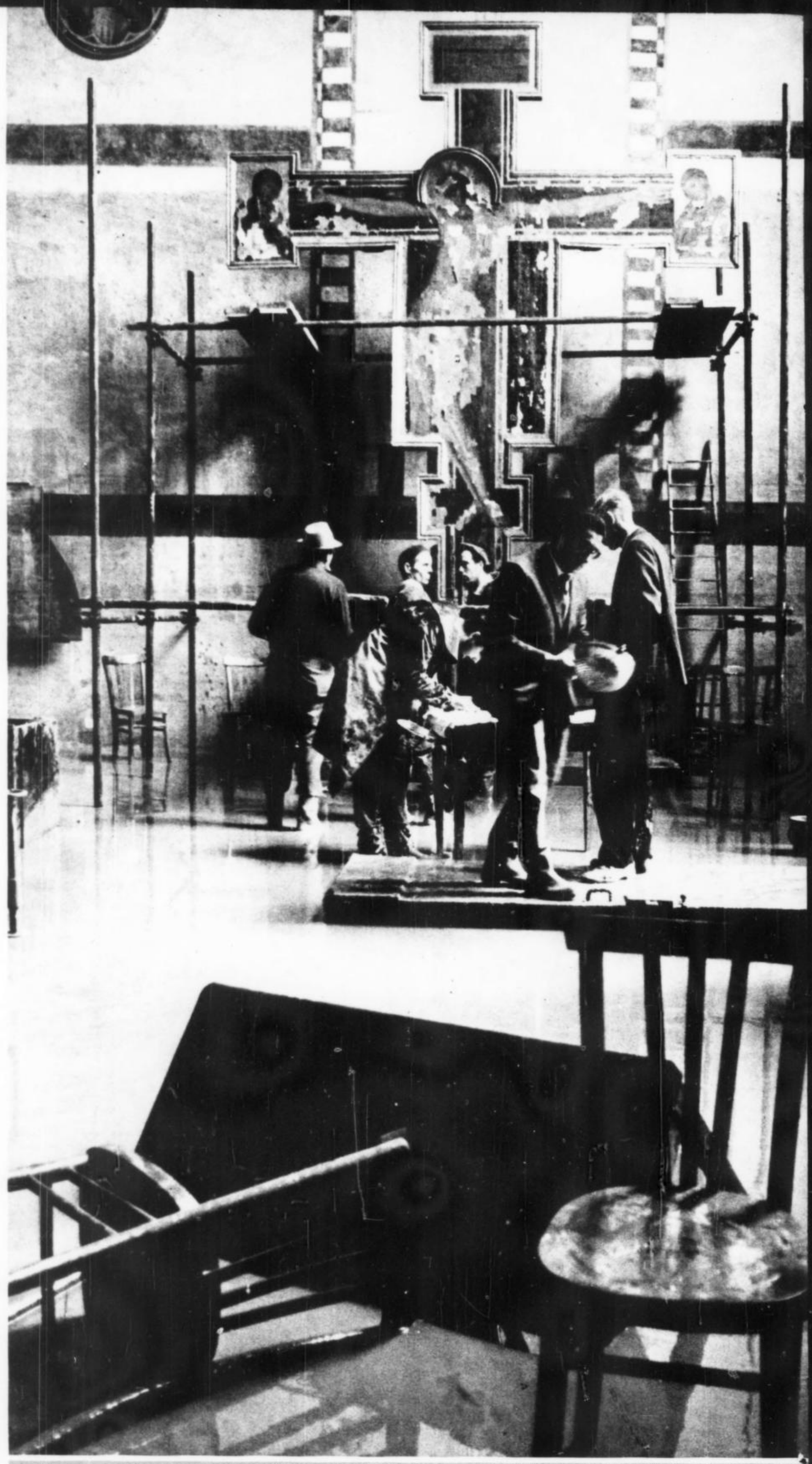

Photo © Epoca - Sergio del Grande

Using vegetable strainers to sift carefully through the mud, specialists search for tiny fragments of paint from the celebrated "Crucifix" by Cimabue. In the museum of the church of Santa Croce water submerged most of the big wooden crucifix. When water withdrew, blisters opened on the paintwork and 60% of the painted surface flaked away.

The 'Crucifix' by Cimabue

A SEVEN CENTURIES-OLD MASTERPIECE RUINED

Cimabue's "Crucifix" (detail right), the masterpiece which launched a new era in Florentine painting in the 13th century, is now ruined (below). The work had already survived a series of disasters. Placed high on the choir screen in the church of Santa Croce, it came through the great floods of 1333 and 1466 unscathed. About 1500 it was moved to the left wall of the church, otherwise it would have been destroyed in 1512 when a storm toppled the campanile, which hurled down a mass of debris on top of the choir screen. After being moved in and out of various chapels, the "Crucifix" ended up on the top floor of the Uffizi Gallery, where it would have been safe in the recent floods. But less than two years ago the work was returned to Santa Croce and put in the low-lying museum where the waters reached it on November 4.

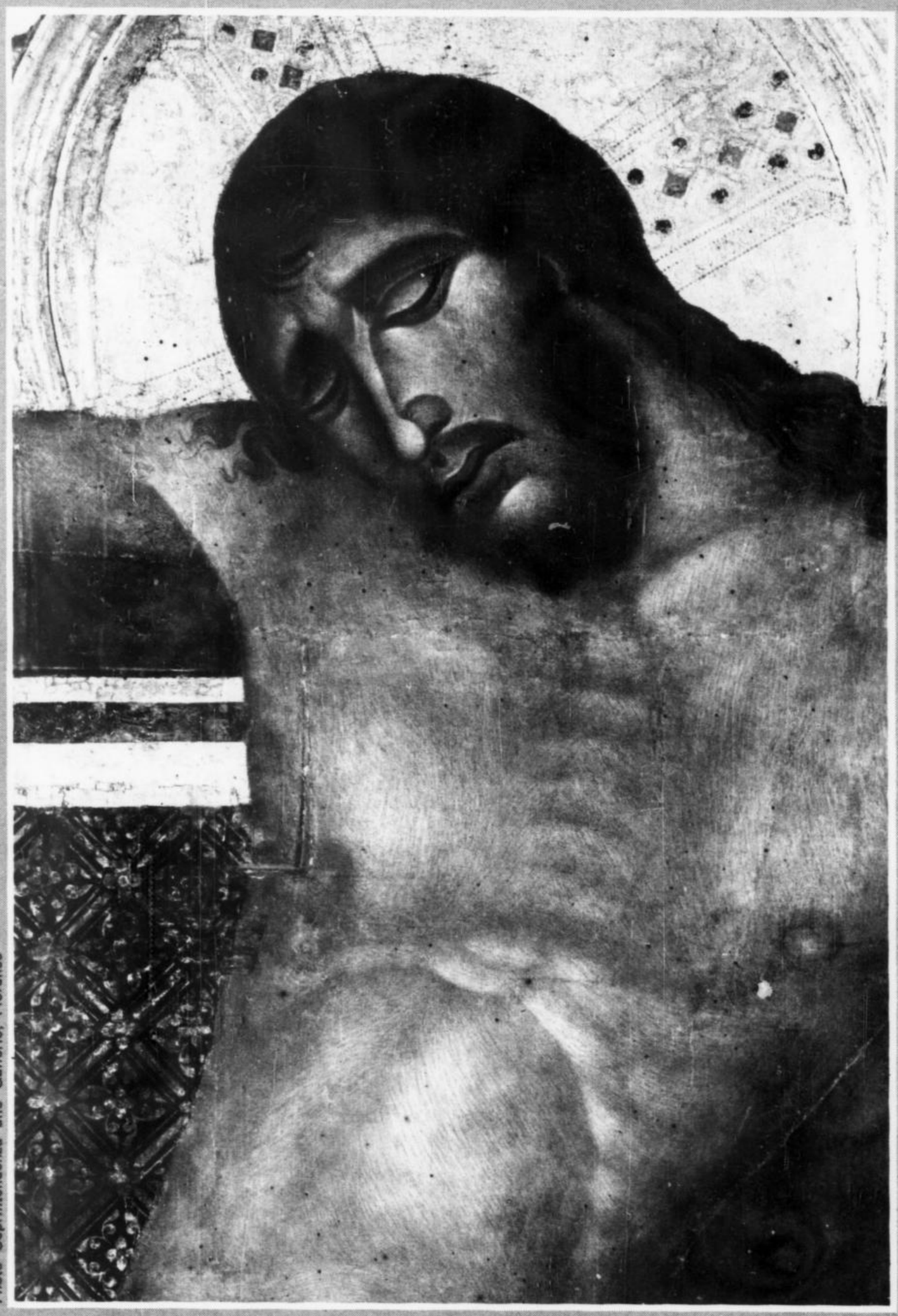

Photo Soprintendenza alle Gallerie, Florence

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Photo © Roger Viollet, Paris

Left, the "Gates of Paradise", one of three doorways in the Baptistery. Its ten gilded bronze panels fashioned by Lorenzo Ghiberti illustrate stories from the Old Testament. Right, the panel "Joseph and his Brothers" is taken to safety after recovery from the sea of mud. Panels 1, 2, 3, 4, 5 and frieze (6) were ripped off.

Ghiberti's 'Gates of Paradise'

5 PANELS OUT OF 10 RIPPED OFF

THREE torrents sweeping at over 60 kph. (40 mph.) into the Piazza del Duomo, in Florence, battered and shook the immense bronze doors of the Baptistery. The celebrated "Gates of Paradise"—so named by Michelangelo—were especially badly hit. The sculptor and goldsmith Lorenzo Ghiberti spent 27 years (1425-1452) fashioning these doors. Five of their ten massive gilded bronze panels were torn away, but were later recovered from the mud, their exquisite reliefs stained with oil. Reliefs on three panels—"The

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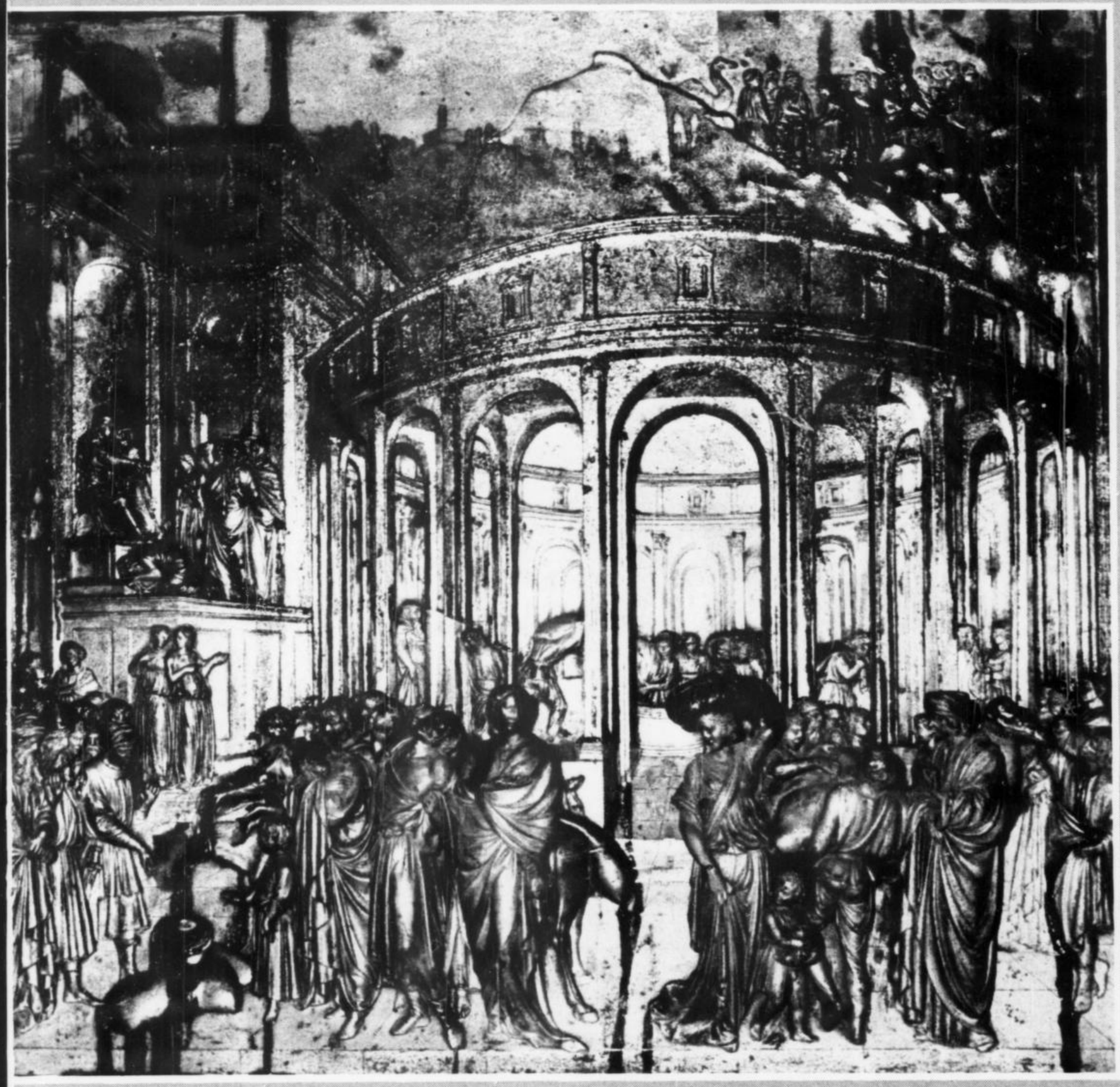
Foto - Fiorenza, Florence

Photos Unesco - Dominique Roger



Two of the five panels dislodged from the "Gates of Paradise" and coated with oil and mud. Above, "Jacob and Esau", split in several places; left, "Joseph and his Brothers."

'GATES OF PARADISE' *(Continued)*

Creation", "Cain and Abel" and "Jacob and Esau"—suffered damage. Two of the five dislodged panels—"Joseph and his Brothers" and "Cain and Abel" —were displayed at Unesco H.Q. in Paris on December 3 and 4, 1966, following the launching of the International Campaign for Florence and Venice by the Director-General of Unesco. Also on view was a smaller panel, "The Angel Appears to Zacharias," wrenched from another Baptistery door.

This doorway was wrought in 1336 by Andrea Pisano, who related the life of John the Baptist, patron saint of Florence, in twenty bas-reliefs to which were added eight allegorical panels representing the virtues.

Photo © Reporters Associés, Paris

Photo Unesco - Bablin

Pisano's doors of bronze

Chips and splits in these heavy bronze doors on the south side of the Baptistery show the devastating force of the floodwaters and the debris they hurled forward like projectiles. From the panels in this doorway by the sculptor Andrea Pisano, two have been torn away. Above the empty frame, a relief showing the entombment of John the Baptist is intact. Left, "The Angel Appears to Zacharias", a panel from the same door recovered after the waters subsided.

DIMENSIONS OF A DISASTER *(Continued from page 16)*

UFFIZI. Main collection intact, but storerooms on ground floor flooded to depth of nearly two metres (5 ft.). Works damaged in restoration studios include: triptych by Pietro Alemanno, a polyptych by Lorenzo di Niccolo. Works by Botticelli, Tiepolo, Masaccio and Filippo Lippi rescued in time, but photographic archives containing over 130,000 negatives inundated.

CHURCHES AND MONASTERIES

SANT' AMBROGIO. Over two metres (11 ft.) of water half immersed nave altarpieces. Works by Baldovinetti, Bicci di Lorenzo, Cosimo Rosselli and Raffaellino, and wooden "St. Sebastian" by Leonardo del Tasso seriously damaged.

SS. ANNUNZIATA. Lower areas of walls and columns smeared with mud and oil. Damage to backing of frescoes by Baldovinetti, Andrea del Sarto and others. Frescoes by Castagno immersed up to 30 centimetres (1 ft.).

SS. APOSTOLI. Water rose to over three metres (14 ft.) in nave and left behind a pile of mud and debris a metre (3 ft.) high. All works of art and other objects in nave damaged or destroyed. Della Robbia tabernacle coated with muddy oil. Vasari's masterpiece, "The Immaculate Conception" has flaked with some complete paint losses; the panel is distorted and split. Altarpieces by Maso de San Friano and Lorenzo di Niccolo seriously damaged.

BAPTISTERY. Impact of flood waters and debris battered and cracked the bronze doors. Andrea Pisano's right hand door cracked across; one panel was torn away. Five panels of Ghiberti's famous "Gates of Paradise" were wrenched off. All were recovered, though some damaged. Inside building, serious damage done to Donatello's wooden "Magdalene" and to the "Baltassare Coscia" monument of Donatello and Michelozzo.

SANTA CROCE. Six metres (nearly 20 ft.) of water in the refectory and the Pazzi Chapel. Floor in a museum room "exploded" under pressure of water in cellars, which surged up to height of vaults. The celebrated "Crucifix" of Cimabue, one of the most precious Florentine masterpieces, irreparably damaged. Taddeo Gaddi's great fresco "The Last Supper" submerged and seriously damaged. Bandinelli's beautiful marble "Pieta" totally covered by oil in crypt. A long list of damaged pictures includes works by Santi di Tito, Giorgio Vasari, Maso di Banco, Bronzino and many others. Frescoes by Giotto literally escaped by inches.

THE DUOMO (Cathedral of Santa Maria del Fiore). Flooding in excavations of previous church, Santa Reparata, caused structural collapse which affected marble floor of Duomo: new floors required in two sacristies. Two organs damaged. A "Last Supper" by Giovanni Balducci, placed temporarily in a cellar for restoration, was immersed and badly damaged.

BADIA FIORENTINA. All ground floors of convent buildings damaged, particularly flooring tiles.

SAN FIRENZE. Serious damage to the foundations, floor and sacristy.

SAN GIUSEPPE. An "Adoration" by Santi di Tito is badly buckled and cracked in the lower half. Water covered "Crucifix" by Lorenzo Monaco and several altarpieces to half their height or more.

SAN JACOPO SOPR'ARNO. Three metres (10 ft.) of water in the nave. Damage to altarpieces (largely on canvas and mostly 17th or 18th century).

SANTA MARIA DEL CARMINE. Structural damage to floors. Masaccio's frescoes, ranking among the great Renaissance masterpieces, untouched.

SANTA MARIA MADDALENA DEI PAZZI. Enormous masses of sludge mixed with debris and oil damaged church and cloisters. Frescoes by Perugino and his pupils, the "Crucifixion" and the "Deposition" harmed and all altarpieces by Puligo, Santi di Tito, Carlo Portelli, Cosimo Rosselli, Raffaellino and others partly immersed.

SANTA MARIA NOVELLA. A metre and a half (5 ft.) of flooding in the nave. Thick coats of oil covered the great frescoes of the Spanish Chapel, the Strozzi Chapel and the Chiostro Verde. Panel of altarpiece by Bernardo Daddi (Spanish Chapel) buckled and paint flaked off. Damage done to the ancient pharmacy and the adjoining chapel with frescoes by Spinello Aretino.

OSPEDALE DI SANTA MARIA NUOVA. Vaults and floors in basement damaged. Public library books and stocks of books from fine arts, historical and theatrical collections completely submerged.

ORATORIO SAN NICCOLO AL CEPPO. Fra Angelico's "Crucifixion" seriously damaged.

SAN NICCOLO OLTR'ARNO. Rising to a height of three metres (13 ft.), waters defaced lower two-thirds of altarpieces by Allori and Jacopo da Empoli. In the sacristy, intarsia furniture (16th and 17th centuries) completely destroyed.

SAN REMIGIO. A "Madonna della Misericordia" from the school of Cimabue and a fine "Immaculate Conception" by Jacopo da Empoli seriously damaged.

SAN SALVI. One of the few places where waters rose less high than during the flood of 1557. Even so its force flattened a massive protective stone wall. Three metres (9 ft.) of water in nave reached lower parts of altarpieces. Collection of 16th century paintings and 14th and 15th century frescoes in storage partially immersed. A large "Adoration" by Francesco Brina seriously damaged. In the refectory, water almost reached the beautiful but fragile "Last Supper" by Andrea del Sarto. Floors

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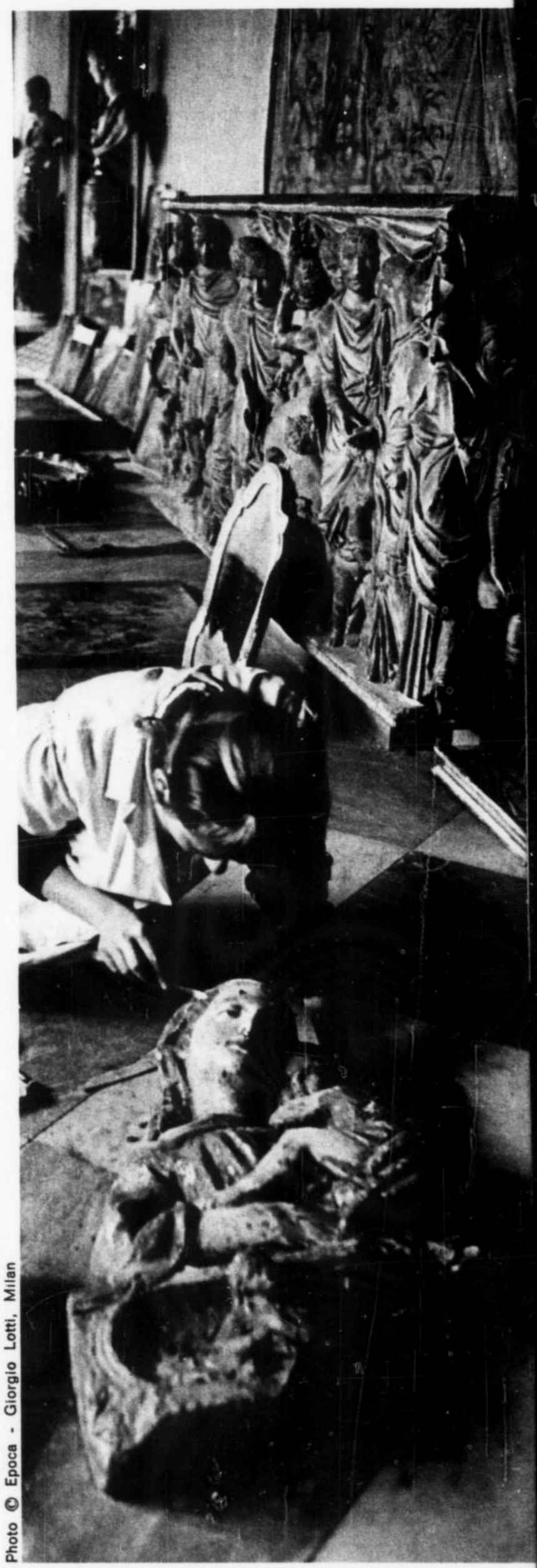


Photo © Epoca - Giorgio Lotti, Milan

Stucco Madonna and child, now defaced with oil, was modelled by Ghiberti, the celebrated 15th century sculptor who made the "Gates of Paradise" doorway for the Baptistery in Florence. Cleaning demands infinite care. Statue was caught by floodwaters in the restoration studio of the Uffizi Museum. Most of works undergoing restoration there were saved in the nick of time.

DIMENSIONS OF A DISASTER *(Continued)*

collapsed and the building is now considered unstable.

SAN SIMONE. Several altarpieces severely damaged, including an important one by the Saint Cecilia Master (1308).

SANTO SPIRITO. None of the Renaissance masterpieces which grace this church was harmed. Minor structural damage to cloisters only.

ARCHIVES AND LIBRAIRIES

ACCADEMIA ECONOMICO AGRARIA DEI GEORGOFILI. Europe's oldest academy of agronomics, founded in 1753. Over 35,000 volumes damaged by mud and water, including 10,000 of great historical and scientific importance. Severe losses in archives for 1753 to 1801.

ARCHIVIO DI STATO. Forty rooms and five kilometres (3 miles) of shelves covered by mud and water. 40,000 volumes containing 50 million documents (45 collections of archives dating from 13th to 19th centuries, including many rare parchment manuscripts) seriously damaged.

ARCHIVI PUBLICI. Public, church and private archives all suffered severe losses. Public archives badly hit include archives of the city of Florence and those of Conservatorio di Santa Maria degli Angeli, Academy of Arts and Drawing, and Chamber of Commerce.

BIBLIOTECA NAZIONALE. Three hundred thousand books affected, including the entire Magliabecchiana collection, the larger volumes of the Palatina, 30,000 volumes of newspaper collections, 20,000 collections of periodicals, and collections of reviews and manuscript catalogues.

GABINETTO VIEUSSEUX. Two hundred and fifty thousand volumes submerged by mud and oil-polluted water. Serious losses.

CENTRO DIDATTICO. Rooms in national educational museum invaded by five metres (16 ft.) of water. Great damage done to 5,000 volumes of documents dating from the 15th to 19th centuries and to rare incunabula. Equipment and ancient furniture totally destroyed.

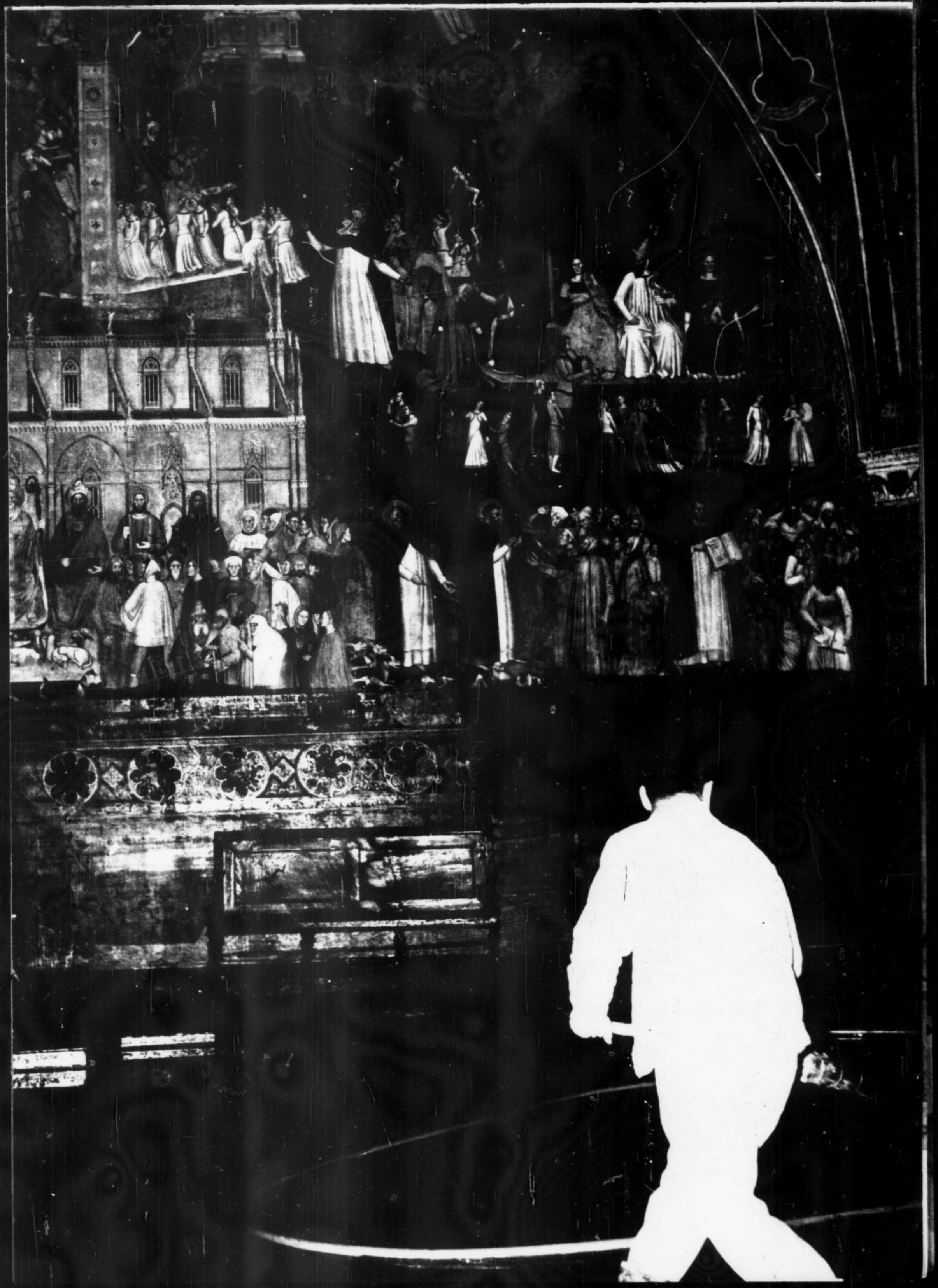
THEATRES. The Piccolo Teatro Stabile suffered heavy losses: official archives, props, costumes, decors, etc. Heavy damage done to electrical and sound apparatus, stage and auditorium. Two other theatres—Teatro Communale and Teatro della Pergola—invaded by waters and seriously damaged.

UNIVERSITA. One hundred thousand volumes, including those in Papini and Berenson libraries, destroyed or severely damaged in Faculty of Letters and Philosophy. In Geographical Institute, half library and all topographical and geographical maps destroyed. In Faculty of Law and Political Science, 2,000 ancient volumes damaged; 1,000 volumes from the 16th and 17th centuries and 20,000 volumes and periodical collections destroyed; 60,000 volumes and collections of reviews damaged. In Institute of Chemistry, many books ruined and almost all equipment put out of action. In Faculty of Architecture, most of the library destroyed. In many other faculties and institutes, serious losses and damage in equipment, books and records.

Photo Unesco - Dominique Roger

Oil-polluted floodwater has left ugly smears on part of the frescoes by Andrea Bonaiuti in the Spanish Chapel of Santa Maria Novella (right). Effects of the floods may well continue for years since dampness in the walls may in time affect the entire surface of the frescoes. Nor does anyone know the final effects of oil —an entirely new hazard. Left, mutilated wooden statue removed from Sant'Ambrogio church for restoration in studios of the Uffizi Museum. In box are statue's hands and hair tress, broken off when wood fibres swelled and split.

Photo Soprintendenza alle Gallerie



THE PAINTING HOSPITAL IN THE LEMON GROVE

by Harold J. Plenderleith

On November 4, 1966, the swollen Arno river burst its retaining walls and flooded all the central section of Florence, the level of the waters reaching heights between 1.50 and 6 metres (4 to 20 ft.) above street level. In Venice the sea broke the coastal dams at several points and the water rose to about 1.50 metre above street level.

Because these events took place at an early hour (between 8 and 12 a. m.) and due to the fact that the day was a national holiday, the death toll was less than might have been expected from the magnitude of the catastrophe.

The damage to cultural property, however, was immense; while initially, at all events, the relatively slow rise of the waters left time for people to reach higher ground, not much could be done for the immense wealth of works of art, the libraries and the archives that stood in the path of the flood.

It must be recognized that the flood level was far above anything that had ever been recorded even though records went back to the 11th century in Florence. This explains why large numbers of objects that were susceptible to damage even by short exposure to damp now found themselves inundated—completely immersed in muddy water contaminated with black oil from domestic central heating plants and from submerged cars.

Dramatic rescue operations took place in the Uffizi Gallery in Florence where the waters progressively invaded the painting storerooms and the restoration cabinet; in the latter, paintings by Giotto, Simone Martini and other great masters were evacuated just ahead of the rising water.

Part of the collection in the storerooms could be lifted to upper levels through a window which had to be broken, as the door was already obstructed by water, but many paintings had to be left behind. At the very time that the salvage operations were taking place, the Renaissance stone building of the Uffizi, exposed to the full blast of the raging torrent, was felt to be shuddering violently and many thought it would collapse as a whole.

Not even a partial salvage was possible in other parts of the city: the museum of Santa Croce and the Cappella dei Pazzi were buried under 5-6 metres (16-20 ft.) of water. Paintings on wood by Cimabue, Bronzino, Vasari, Salviati and detached murals by Orcagna were completely submerged.

Other inundated areas were Casa Buonarroti with a complete art gallery, the church of SS. Apostoli with a famous Vasari panel, S. Ambrogio, S. Piero a Ponti and a number of other churches, less known perhaps, but each one a small precious museum with altarpieces some of which had been standing in their original positions within their original frames ever since the 15th century!

The bronze doors of the Baptistery in Piazza del Duomo were forced open by the great flood of water now having obtained a calculated speed of 40 mph; some of the precious reliefs by Ghiberti and Andrea Pisano fell down and a famous piece of sculpture in wood by Donatello (the Maddalena) was reached by the water, and seriously damaged.

What happened to books and archives was even worse: the National Library (300,000 volumes) and the University Libraries (100,000 volumes) were completely inundated. So was the State Archive of Florence with its unique collection of codices and manuscripts, an immense amount of still unstudied and unrecorded material essential for the study of Florentine history and art, one of the reference points of western civilization. Here some 40,000 volumes were involved.

In the Archaeological Museum where the Etruscan collection was at least as important as Villa Giulia's in Rome, the flood filled up the cellar, then the vaults burst open under the upward rush of ascending water: showcases on the ground floor were shattered and the objects dispersed.

In Venice the Marciana Library was invaded by waters, but paintings and other precious works of art could, for the greater part at least, be transported away from the menaced areas.

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HAROLD J. PLENDERLEITH *is director of the International Centre for the Study of the Preservation and Restoration of Cultural Property in Rome. He was in Florence on November 3, 1966, and thus witnessed the catastrophic floods. Before becoming the first director of the Rome Centre in 1959, Mr. Plenderleith was professor of chemistry at the Royal Academy of Arts, London, and Keeper of the Research Laboratory at the British Museum. His best known work is "The Conservation of Antiquities and Works of Art" (Oxford University Press, London, Toronto, New York, 1957).*

Photo Unesco - Dominique Roger

Masked against the fumes of ether and benzol, a specialist sprays an oil-coated marble figure of Mary Magdelene, a 17th century Florentine work. Solvents are the most effective answer to oil stains, but they can only be used on stone sculptures.

Mobilizing

On the evening of November 4 the waters started to recede and by night the river in Florence was back within its original boundaries; more slowly the sea retired in Venice. On ground floors the submerged objects reappeared covered by a thin layer of fine drab coloured mud; black residues of oil marked the walls and statues, parallel black lines indicating the levels of the receding flood.

On superficial examination the objects appeared dirty but unaltered, but the processes of deterioration initiated by the immersion in water were under way; a dramatic race against decay had to be begun at once, if ever the works of art were to be saved.

Wood, even very old wood, absorbs water readily: the process is accompanied by expansion across the fibres. On painted panels the *gesso* layer is softened by the action of water on its binding medium and loses much of its consistence while both *gesso* and colour layers are distorted by the dimensional changes in the wooden support.

The big crucifix by Cimabue had been submerged up to the top of the head of the Christ; when the water withdrew blisters appeared on the surface due both to loss of strength of the *gesso* layer and to the rather speedy contraction of the wood to which the colour layer could not so quickly adjust itself. The enormous weight of the crucifix and its deformation made it very hard to remove from its vertical position.

The rescuers hindered by working over a floor covered by a foot of mud, were unable to save the situation in time, and blisters opened and, to the dismay of all, about 60% of the painted surface flaked away to fall in the mud. The friars of S. Croce carefully sifted the mud for days afterwards; they retrieved a large number of paint flakes, but it is doubtful whe-

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The state of this 13th century triptych (left) dramatically shows the destructive effects of water on painted wooden panels. The painting has been taken from the Santa Croce museum for treatment in the picture hospital at the Palazzo Pitti. The child in the Virgin's arms disappeared as paintwork fell away after the swelling of the wooden support. Months may go by before a painting regains its former state; it is the time taken to "heal" paintings that determines the length of restoration programmes. Right, delicate cleaning operation on a self-portrait by Velasquez, the great master of 17th century painting in Spain. The work was damaged in the flooding of the Uffizi Museum restoration studios.

Photo Soprintendenza alle Gallerie, Florence

an army of art surgeons

ther it will be possible to use them to reconstruct even part of the lost areas.

Other panels underwent the same destructive process before the rescuers could reach them, for some churches remained flooded for days and it was often quite an acrobatic feat just to reach paintings located in positions that were almost inaccessible even in normal times.

With successive drying of the wooden panels one could expect that their condition would further deteriorate because of the dramatic warping of supports, splitting due to opposing and contrasting forces in frames and panels, extensive blistering and flaking of the colour layer. It was observed that the paintings having thick layers of transparent varnish exhibited better resistance to water than the thinly varnished ones.

Canvas paintings showed in general good resistance, except when physically damaged by objects transported by the flood; however, the latter kind of damage is less disfiguring by far than would appear at first sight, a simple relining operation being the traditional and effective answer. The excellent resistance to water of linseed oil based grounds was here the deciding factor. Neither, in general, did mural paintings suffer substantial damage; the hardboard supports of detached murals, however, easily became distorted by exposure to changing humidity and careful control of their stability will be necessary in the future.

Two immediate dangers lie ahead for submerged books and documents: rotting and physical disintegration of paper, and the cementing together of contiguous sheets to form single blocks

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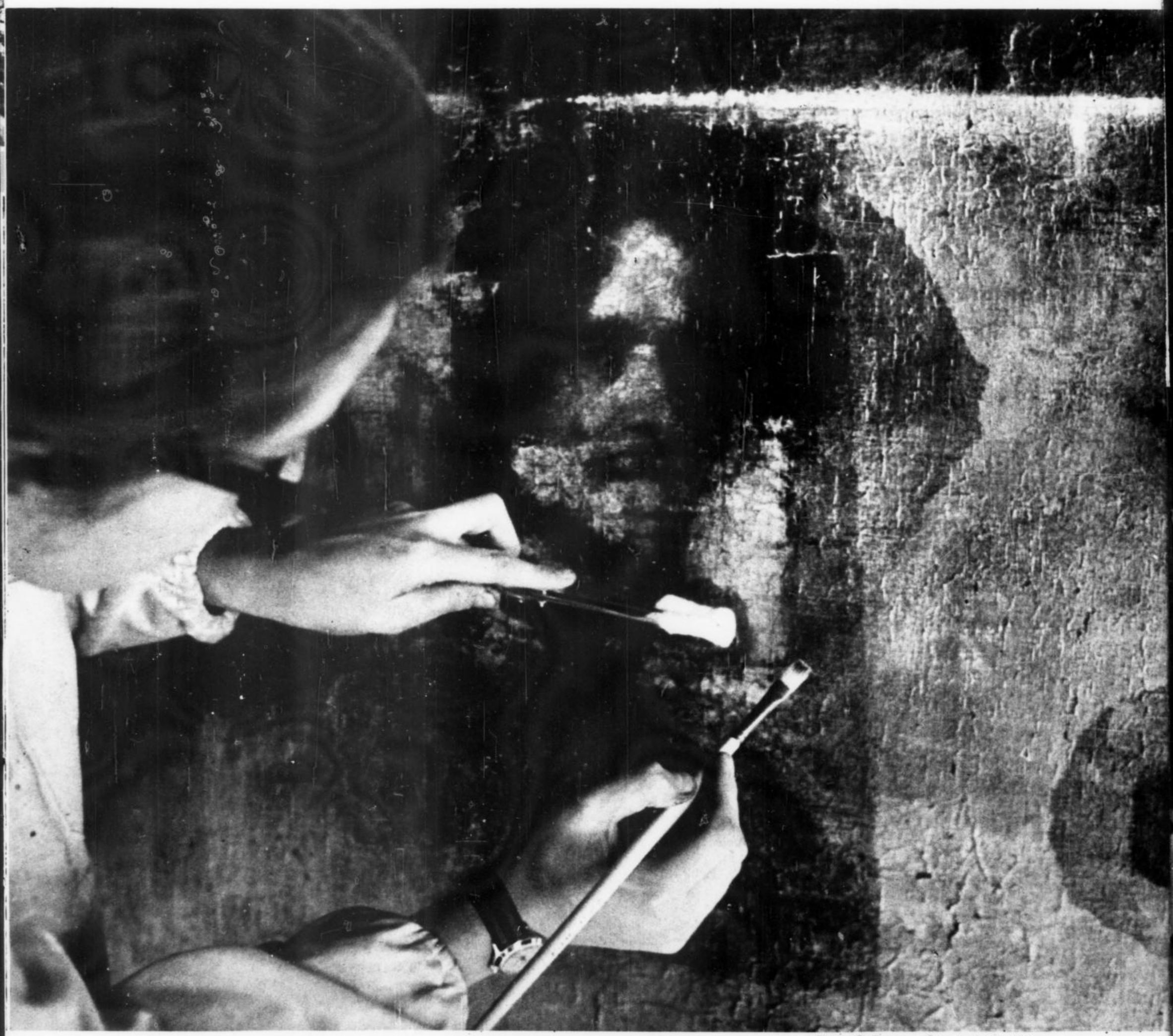

Photo © Epoca - Giorgio Lotti, Milan

Preventing the warping and blistering of the art treasures

on drying. Farther on in time mould growths are to be expected on partially dried paper and these produce disfiguring marks. While such a situation might be easily handled in the case of a small number of books and documents, the problem now was to deal simultaneously with over a million books and an archive which had covered a surface of some thousand square metres (over 10,000 sq.ft.).

More stable materials like bronzes and porcelain were better able to survive, always provided that they were not damaged by mechanical impact; some della Robbia polyptychs were submerged but reappeared apparently in perfect condition.

The facilities available to the local *Soprintendenza* were greatly exceeded by the magnitude of the disaster, and almost no emergency action was possible with the means immediately at hand. But even before an official call for help was made volunteers came quickly to the rescue.

Private experts and art students from Florence and from elsewhere in Italy rallied to help salvage the collections and restorers arrived even from abroad. They had received the news of the water levels in the town and they knew what it meant; a painting restorer drove in from Lugano (Switzerland) across the partially inundated highway system, though not really believing what he was being told ("it must be one of those inflated newspaper stories"). Others came from Bologna and Rome; the Rome Centre made its own immediate contribution in supporting an emergency expedition of the neighbouring Istituto Centrale del Restauro.

Panel paintings were the first worry of the painting experts; to avoid the sad catastrophe of the Cimabue, panels had to be laid down flat so that paint would not fall from them even if blistering occurred. Then they had to be faced with specially fine tissue to give a strong support to the paint layer, now held only weakly by the *gesso*, and this in view of the foreseen shrinking and warping of the support.

Prior to facing, the paintings had to be cleaned from mud, a very delicate operation as the mud overlay softened and swollen surfaces; experience taught that the best way was to damp the mud again with water using a soft brush, then to suck up the muddy water with a very soft sponge. While Japanese tissue was generally used as a facing material, in the rush of the moment almost any kind of available material had to be brought into service.

Reconsideration of the problem after a few hours led to general agreement that there should be a standard policy using acrylic resins (Paraloid B72 or Elvacite 2045) because they would be easier to re-dissolve in the future and were not subject to the danger of being nutrients to mould growth. As soon as the technique became unified the emergency teams ran out of materials, and a frantic search started for Japanese paper and acrylic resins and their solvents.

Here the Rome Centre had a key function in assessing the needs and transmitting the call to possible suppliers. Acrylic resins came from many sources in Italy and abroad. A restorer from Bologna had a stock at home; his family went on for days shaking the slowly dissolving polymer with the solvent. One great Italian firm which by chance did not manufacture the precise material required was kind enough to purchase a large supply and ship it free to Florence.

The International Centre for studies on restoration

The International Centre for the Study of the Preservation and Restoration of Cultural Property was set up by Unesco in Rome, in 1958. It operates as an international advisory centre for every kind of technical and scientific problem relating to the preservation and restoration of cultural property.

It is an international laboratory for the study of diseases of stone, wood and other materials, and also co-ordinates and stimulates research into restoration techniques. It helps to train researchers and technicians and compiles and publishes special reports and studies.

It works closely with Unesco, the International Council of Museums (ICOM), the International Institute for the Conservation of Historic and Artistic Works (ICC) and many institutes and laboratories in Italy and other countries.

Thirty-nine member countries support and contribute financially to its work.

Advice given by the centre is usually based on the reports of specialists which it sends to make on-the-spot studies of monuments and other cultural property in need of conservation or restoration. Typical examples include the preservation of monuments in Nubia, the painted murals of Bonampak (Mexico) and Buddhist monuments in the Republic of Korea, and also the setting up of conservation services in Tunisia and Morocco.

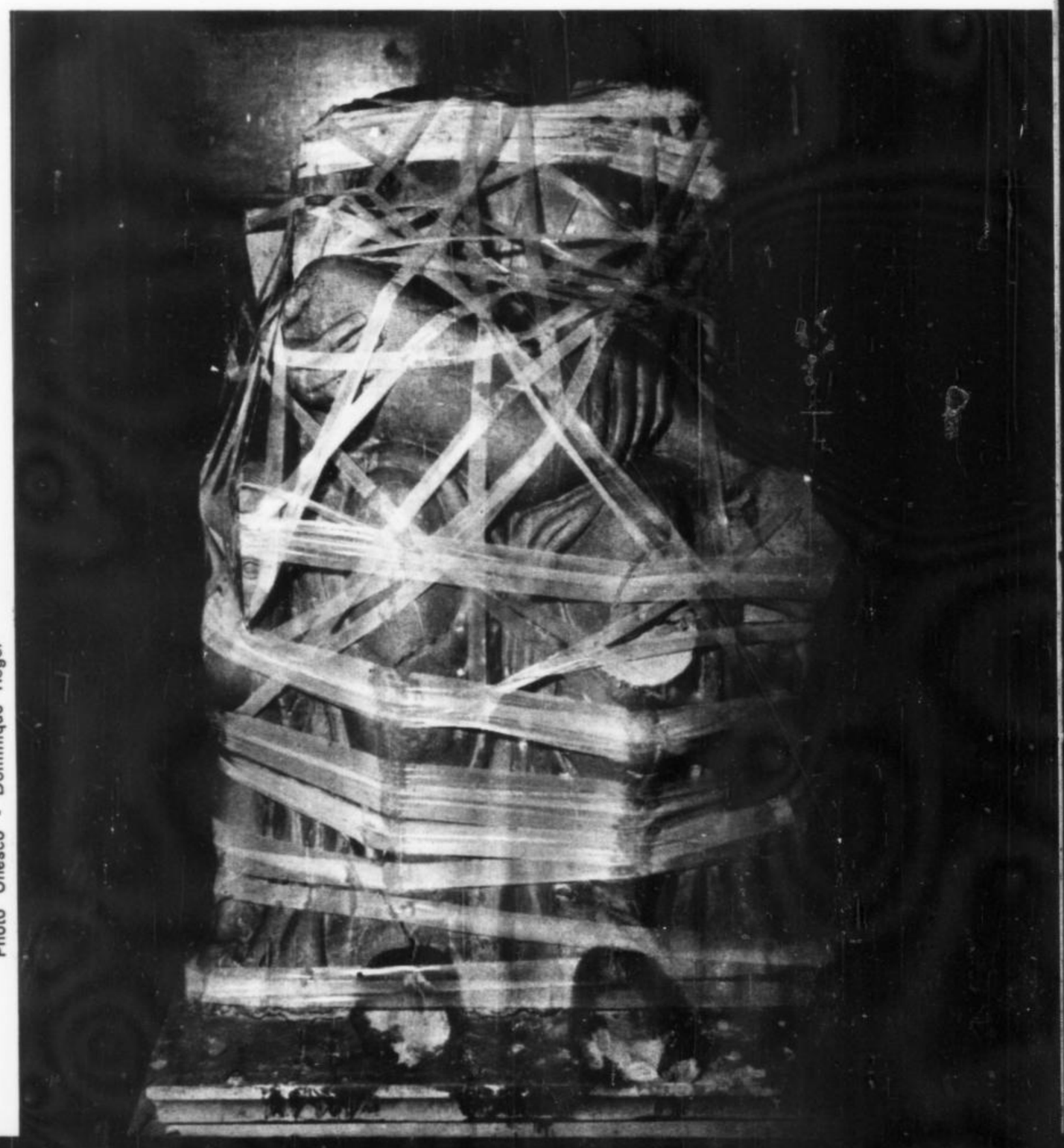

Photo Unesco - Dominique Roger

The Laboratory of the National Gallery, London, gathered all that was available and sent it at the earliest moment: it arrived (via Rome) on the table of a restorer in the Uffizi Gallery within the day and just when he had exhausted his own personal supply.

It was found that Kleenex tissue could be used as a substitute for Japanese paper but it was not easy to find usable tissue in downtown Florence where all chemist shops and drugstores had been flooded. The first packs of Kleenex that the Rome Centre secured were of a pale blue shade and this accounts for the bluish tinge of the faced Bronzino and Vasari paintings in Santa Croce today!

Parallel with this work carried out in feverish haste, plans were developed for drying the wet panels slowly under controlled conditions in order to minimize shrinking and warping. The Rome Centre took care of placing hygrometers in the key points where damaged panels were being collected and when, seven days after the inundation the weather turned cold and dry, the faced panels were lowered closer to the wet muddy floor, and wet sawdust was added to keep the areas damp.

An immense storeroom was in the meanwhile being prepared where the 400 panels and 1,000 canvases which had been victims of the disaster could be sheltered under controlled humidity and temperature conditions. The so-called *Limonaia*, a huge (120 m. long and 10 m. high) masonry shelter for the unique collection of lemon trees of Palazzo Pitti, was requisitioned for this purpose, and incidentally there arose the problem of finding another shelter for the lemon trees which were threatened with destruction because of the decreasing temperature.

In a little over one week the *Limonaia* was converted to become a hospital for paintings. It was equipped with a stock-room for materials and wooden stands for the pictures; thermal insulation of walls and windows was improved and finally a heating and humidifying system was created. Two weeks after the inundation the paintings started to come in; it appeared that no further damage had taken place in the panels after the first dramatic hours.

For books and documents the emergency teams were composed of students, Benedictine friars of abbeys like the one of Grottaferrata (near Rome) dedicated over the centuries to the restoration of codices and manuscripts and of experts from the Istituto di Patologia del Libro in Rome. The emergency procedure consisted in getting rid of the mud, interleaving with a suitable kind of paper, then drying as soon as possible.

Many hundreds of high school and university students formed lines in the mud passing books from hand to hand to evacuate the flooded areas in the libraries and in the archives. Part of the books were sent away in blocks of 10,000 to the Benedictine abbeys of Praglia, Monte Oliveto, Grottaferrata, Cesena, S. Maria Novella, or to the Istituto di Patologia in Rome, but some of the most urgent treatment was begun immediately in Florence.

Water could be squeezed out by means of hand presses, drying could be accomplished using industrial drying equipment of large dimensions. It was found for example that tobacco and brick manufacturers had just the kind of equipment that was needed. This work is in progress now. On the other side precious codices were removed to the Vatican Library for specialized treatment.

At the present time it is still impossible to assess the amount of losses among the books and archival materials damaged by the inundation.

At the Archaeological Museum no emergency intervention has been carried out so far; here are housed ceramic and metallic objects from excavations and these have already been acclimatised to conditions in damp soil. The danger here is thought to be in the mechanical damage to fragile objects or the possible loss of loose parts in any hasty recovery campaign.

Meantime the museum has been secluded from the rest of the world; nobody is allowed in the rooms. The semi-dry mud will be excavated inch by inch using the most refined archaeological techniques. Repair of the damaged objects will come in due time, using methods that are already well established.

Temporary protection of panel paint-

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Florence has been called "The Athens of the Modern World". The Etruscan collections in its archaeological museum, along with those of Rome, rank as the finest in the world. Under pressure from water in the museum's cellars, floors in groundfloor rooms literally exploded (right) and glass cases of exhibits were demolished. Thousands of exhibits, including bronze and ivory objects, sculptures and sarcophagi were destroyed. Left, taped like an ancient mummy, a valuable Etruscan terracotta work awaits reconstruction.

Photo © Epoca - Walter Morl, Milan

OVER A MILLION WATERLOGGED BOOKS AND MANUSCRIPTS

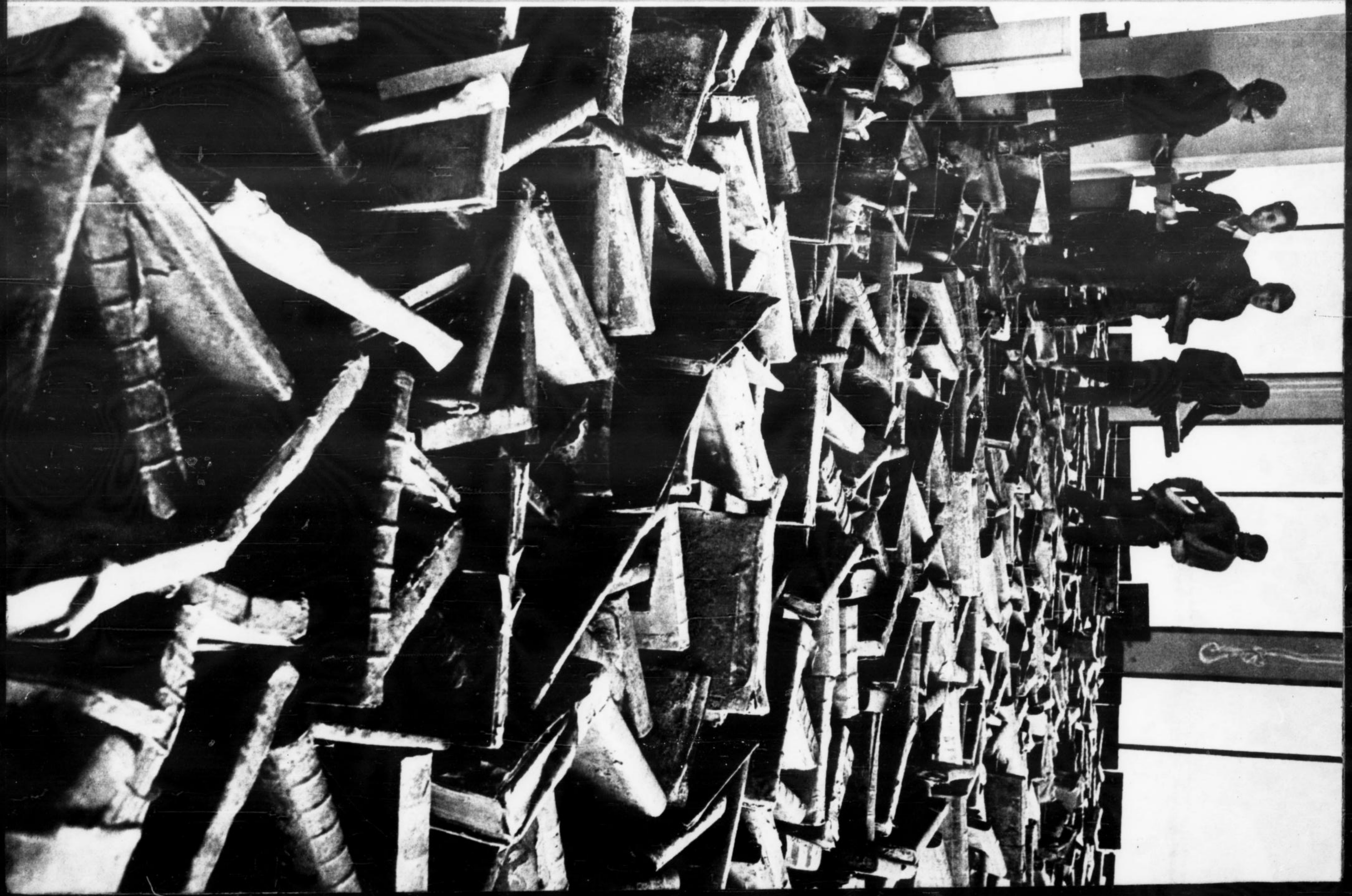
Photo © Epoca - Walter Morl, Milan

Hundreds of thousands of books old and new, irreplaceable historical documents, unpublished manuscripts of literary and musical works were submerged by floodwaters in the basements of Florence. At the National Library alone, 300,000 volumes had to be rescued from scenes of indescribable chaos (photo left). Teams of helpers came spontaneously to Florence. Among them were many young people, including Italian and foreign students. Chains of volunteers worked day and night (above) to evacuate the sodden, muddy volumes. These were washed and then stored in safety (right) to await first-aid treatment. Below, volunteer helper puts blotting paper between pages. This operation has to be repeated three times for each page, for each volume, for hundreds of thousands of volumes.

CONTINUED ON PAGE 32

Photo Unesco - Dominique Roger

Photo © Epoca - Giorgio Lotti, Milan



Over a million waterlogged books and manuscripts

(Continued)

Photo © ANSA, Rome

Florence, city of the arts, is today a city of volunteers engaged in saving its treasures. Specialists and student volunteers work side by side in improvised centres throughout the city, as well as in restoration studios and monasteries elsewhere in Italy, giving first-aid treatment to books. The volumes are taken apart and washed page by page in tanks of water (right) and then hung out to dry. Above, innumerable pages dry out slowly. Too rapid drying would make the paper brittle. Enemy No. 1 of these books is mould. To combat it a vast operation has now begun to disinfect the volumes by injection (left) or fumigation.

Photo Gieffe, Florence

Photo Unesco - Dominique Roger

The painting hospital in the lemon grove *(Continued from page 29)*

ings by facing and controlling their environmental conditions obviously is no final solution of the problem of ensuring permanency and full visibility of the paintings. Many roads, however, are opened for possible treatment and one can safely assume that the treatment will be diversified and that it will be adapted to the particular conditions of each single panel.

Probably an effort will be made to avoid transfer of panel paintings to a new support, since this operation may imply a substantial alteration of the work of art. It may well be that the damp wood could be treated with solutions of synthetic or natural resins in order to displace the water from the inner structure by substituting the inert resin, thus avoiding collapse of the cell walls on drying.

It must be remembered, however, that the *gesso* ground might have lost part of its cohesive strength, so impairing the adhesion of the colour layer to the support. In such conditions the painting would live in perpetual danger of blistering and flaking of the paint. When, as in such a case, the strength of the ground cannot be restored by appropriate fixing operations, transfer to a new support is likely to be inevitable if the painting is to be saved.

Problems lie ahead also for books, archival documents and manuscripts, for obviously industrial dessication cannot be pushed too far or it would damage the mechanical properties of the sheets. If left too humid, on the other hand, the paper would be subject to mould infection. This underlines the importance of adopting a disinfection procedure. It appears that vacuum fumigation with ethylene oxide will be the preferred procedure, but there is a serious problem of obtaining specialized equipment and technical personnel to handle it.

Since books and documents are being distributed in different locations for treatment, the Istituto di Patologia del Libro is planning to use movable fumigation units which could be posted according to momentary requirements and at the time of writing a hue and cry is being issued in the hope of locating such additional help.

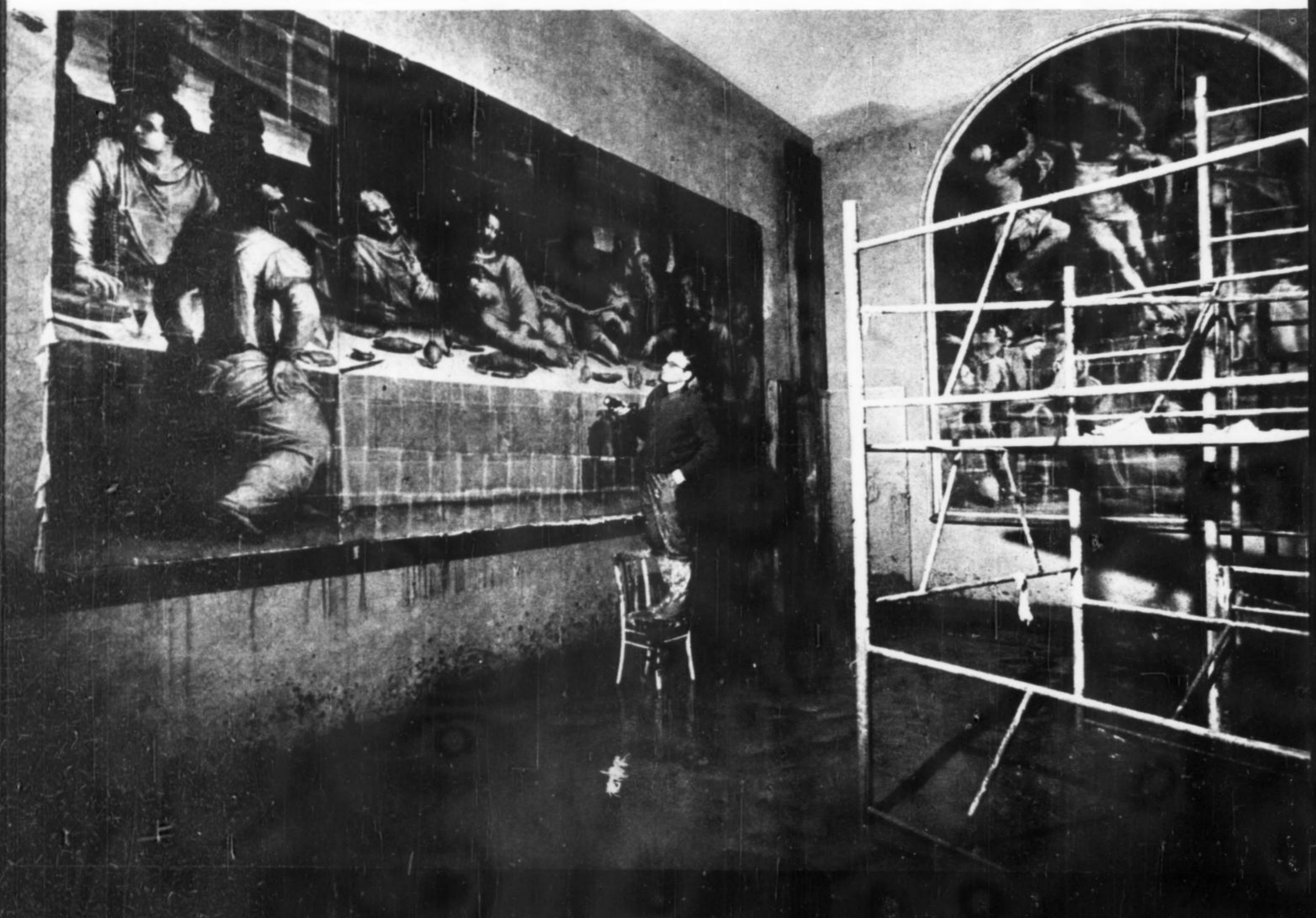
Who will do the restoration of manuscripts? We have seen that a solution to this problem has already been found for paper materials; it is fortunate that many religious institutions in Italy are specialized in this kind of work. Far more difficult is the problem for paintings (for a total of over a thousand paintings requires restoration work by skilled personnel).

This exceeds the limits of possibility for all the state institutions and private restorers in Italy. However, it must be remembered that offers of help by specialized experts are coming in from all over the world: Britain, U.S.S.R., U.S.A., Yugoslavia, the Federal German Republic, Canada, Poland among others.

The Florence disaster thus opens the way for a major project in international co-operation which, aside from its spiritual value as a proof of goodwill, has deep implications for technical exchange and progress. If progress results from disaster, as often happens, it will not be for the first time in Italian history that victory has been thus achieved.

The superb frescoes in the Museum of Santa Croce—one of the great legacies of Renaissance painting—were submerged under several feet of water. Below, deterioration is clearly visible on Vasari's "Last Supper", painted in 1546 (left of photo) and on "Descent from the Cross" by Alessandro Allori (1561). The water had hardly subsided when rescuers began to apply first aid—cleaning mud from paintings and covering them with special paper to absorb moisture and consolidate the paint.

Photo © Epoca - Giorgio Lotti, Milan



The river that lost its way. A roaring torrent from the Arno sweeps through the Via Tornabuoni in the heart of Florence on November 4, 1966.

Photo © ANSA, Rome

The anatomy of the flood

by Dino Tonini

AN atmospheric disturbance of exceptional violence on November 3, 4 and 5, 1966 poured torrential rain over vast areas of Italy for more than 48 hours. Snow already accumulated in the mountains thawed rapidly. Abnormally high tides and gales lashed the Gulf of Venice. These are the cause of the rampaging floods that have devastated large parts of Central Italy.

Almost one-third of the country, about 100,000 sq. km. (nearly 40,000 square miles), with its historic cities, industrial centres and fertile farmlands has suffered grievous loss of life as well as serious damage and destruction, not only to public works, technical installations and industrial plants, but also to some of the finest treasures in an artistic heritage that belongs to all mankind.

In the last fifty years, Italy has been the victim of 130 serious floods and innumerable lesser inundations. In the Po delta alone (the Province of Rovigo between the lower reaches of the Po and Adige), 20 floods occurred between 1945 and 1965 alone.

For centuries Italy has been fighting floods. But the immense technical and financial efforts employed have inevitably had to be dispersed over large areas and many years with the

CONTINUED ON NEXT PAGE

DINO TONINI *is honorary president of the International Association of Scientific Hydrology and a member of the Italian National Commission for Unesco. A professor at the University of Padua, Italy, he is the author of many studies on hydrography and hydrology.*

Over 8 million acres need new forests to check erosion

result that they have succeeded only in the case of the most recurrent floods.

Take the work of afforestation and the stabilization of mountain regions. This is the very basis of any struggle against floods, but its results are not seen for at least a generation. Storms nearly always occur when the soil is just beginning to become firm and in a matter of hours a cloudburst destroys the work and hopes of many years.

Embankments are built, destroyed and then rebuilt higher and higher in a continuous battle against the enormous quantities of solid matter brought down by rivers in spate because there are no natural or artificial lakes to halt them. These alluvial deposits eventually raise the level of river-beds above that of the surrounding countryside.

Finally, man's hunger for land has meant that the unfarmed areas between one embankment and the next, or in the vicinity of deltas where floods were once able to spread and lose some of their force, have shrunk more and more. People settle in areas which should have continued to play a protective role, and where measures taken against the most recurrent and therefore less important floods may well have created a false feeling of security.

IN Italy there are few large rivers but tens of thousands of torrents, due to the morphology and hydrographic structure of the Italian soil: 10.4 million hectares (26 million acres) of mountains; 11 million hectares of hilly ground, and less than 6 million hectares (15 million acres) of plains. So the waters rush down steep, bare slopes no longer impeded by the forest which once covered a great part of the peninsula.

Since the Middle Ages entire forests have been destroyed, either to provide timber for Europe's fleets, or to obtain land for farming or pasture. Three and a half million hectares (8.6 million acres) need replanting with trees; meanwhile the erosion of the land continues unchecked and the waters continue to carry away rich humus to the sea and to cause landslides and avalanches.

All this was demonstrated more violently than ever during the recent floods. The waters tearing down the mountain sides brought with them stones and rocks and earth. An already precarious situation was aggravated by temporary obstructions—backwaters, diversion of river beds, silting—the disastrous effects of which persist long after the waters have retreated, as though the waters themselves had become petrified in a new world of apocalyptic appearance.

ON the plains the muddy waters have left a malodorous deposit of mud and oil as well as the putrefying remains of animals and plants to sully alike fertile fields and famous monuments, the patient work of small craftsmen and vast installations of modern industry, irreplaceable manuscripts and yellowing papers in some humble office.

To this must be added the onslaught of the raging sea on the barely reclaimed lands of the Po delta lying just beyond the battered and broken defences of Venice.

The discharge of flood waters depends on various meteorological, geological and hydraulic factors: intensity, distribution and duration of the rains (sometimes accompanied by the rapid melting of accumulated snow); general climatic conditions; greater or lesser permeability of the basic geological formations and of the layer of detritus covering them; types and extent of cultivation; shape of the major and minor hydrographic basins; gradient of the slopes and drainage channels; natural and artificial lakes; areas for the spreading of flood waters; stabilization of the river-beds or along the river-beds; river defences; public or industrial works; human habitations.

Every flood is the result of a special combination of some of these factors, each of which has a specific importance. Those in which an almost equal number of predominant factors of average magnitude are combined cause the normal floods which occur with some regularity (on an average once a year or once every two, three, five or ten years). Combinations of the maximum number of factors of extreme magnitude cause exceptional floods which may occur only once every 50, 100, 200 or 1,000 years, or even longer.

The chief stumbling block to forecasting the recurrence of exceptional floods is the lack of precise information about the number and importance of the factors involved, and particularly the maximum figures for rains, snow, temperatures etc. Available statistics, which rarely date back more than a century, at best indicate a tendency and certainly not maximum figures, which we are still unable to calculate even by theoretical studies. Observations of present-day floods give some indication of the extent of floods in past times, but they do not tell us how many of the factors involved had attained their maximum intensity.

Such figures, in any case, usually apply to water levels and not to the corresponding discharges. Water levels fluctuate even with the same discharge because they depend to a great extent on local conditions in the river-bed, the existence of breaches and whether or not there is room for the water to spread.

TO speak of a maximum flood, as people often do, is absurd. Instead, we should talk of floods with a probability of one-in-a-hundred, or one-in-a-thousand; floods, in fact, that occur on an average once every hundred years (centennial floods), or once every thousand years (millennial floods) etc. "On an average" in this context stresses the aspect of probability; centennial floods may occur twice in a century, in consecutive years even, and there may be no floods at all in the next century.

Hence, forecasts can do no more than assess approximately the probable scale of flooding. The larger the flood, the less often it is likely to occur because of the reduced possibility that all the factors involved in a large flood will reach their maximum levels simultaneously.

Over 100 persons died in the Italian floods of November 1966. Many industrial installations were damaged or destroyed. Nearly a million acres of fertile lands were inundated, 50,000 cattle drowned and enormous reserves of fodder submerged. In the countryside 12,000 buildings were destroyed. Here, tree trunks have jammed the village street at Caprile (Venetia).

Photo © Associated Press

It is impossible to predict when exceptional floods are likely to occur, except in general terms—that they are much more likely to happen in certain seasons (autumn and spring, for example)—or just before the floods actually begin, on the basis of rainfall observations, the state of the ground, the capacity for water storage and so on.

This also requires a careful analysis of previous floods, their seriousness in relation to presumed orders of magnitude and the time taken by the floodwaters to reach the primary and secondary basins. The analysis itself presupposes that an efficient hydrometeorological network and communications system has already existed for some time and, above all, that the phenomena will develop according to a certain pattern.

The system for protection against floods is based, in short, on an empirical knowledge of the past which becomes increasingly uncertain the further we go back. It can never be foolproof since it cannot cover certain factors the maximum value of which is not known.

Furthermore a system designed for protection against very infrequent events is so little used that the floods of the past are forgotten and the system comes to be regarded as a perfect guarantee of safety for all time.

THE result is that its upkeep is neglected and its efficiency impaired by failure to apply safety measures to a wide enough area. But the play of forces keeps on shifting until one day an exceptional combination of circumstances brings disaster in its wake. Paradoxically, the stronger the defence system, the more catastrophic the results of its collapse.

The Italian floods of November 1966 fit into this pattern. To find examples of similar floods in the past we have, in some instances, to go back several centuries to descriptions contained in old, forgotten chronicles; in other cases, these floods are a repetition of recent events, considered so exceptional that their recurrence was believed impossible.

In the Venetia region, the rains of 3-4 November 1966 came when the draining lands of the hydrographic basins were already saturated by the heavy rainfall of the previous months, which had already produced considerable flooding at a very unusual season (August 1966).

A point to note is that other floods, likewise fairly serious, had occurred in 1965. In November 1966 the downpour continued for about 38 hours without a break, and increased steadily in intensity from about 10 mm (4 in.) per hour at the beginning to 20 mm. per hour in the last three hours. This accounts for the formation of a single flood wave which attained, and in many cases exceeded, the maximum levels previously recorded in a number of streams.

The actual rain which fell in 24 hours amounted, in many cases, to 15-20% of the mean annual rainfall, and the amount which fell in the 38-hour period totalled as much as 30% or even 37% of the annual mean.

This exceptionally heavy rainfall caused flood waves which rose almost everywhere to levels higher than the maximum previously recorded, even during the disastrous flooding of the Adige in 1882. The recent flooding of the Adige downstream from Trento was considerably lessened by discharging 70 million cubic metres of water into Lake Garda through the recently completed run-off canal.

The situation in the terminal sections of the rivers in Venetia was aggravated by a high tide which reached a level never before recorded in Venice: 1.90 metres (6 ft.) above sea level, against 1.53 metres (5 ft.) recorded in November 1951. Statistics indicated that on the average the level would probably rise to 1.60 metres only once in a century, and to 1.93 metres (just over 6 ft.) only once in a thousand years. What happened to Venice can thus be regarded as a once-in-a-thousand-years event.

The normal tides at Venice cause a maximum rise of 0.60 metres (2 ft.) above the mean, but this level can be

CONTINUED ON NEXT PAGE

A third of a year's rain in 38 hours

raised considerably by, among other factors, an exceptionally high velocity sirocco and atmospheric pressures that are low over the Upper Adriatic and high over the Southern Adriatic and Central Mediterranean.

The exceptionally high tides overcame the centuries-old defences built at the time of the Republic of Venice to protect the lagoon and the city; further south they flooded a large part of the lands in the Po delta. Fortunately the great river did not join forces with the sea, but remained threatening, a few inches below the level of the ground already flooded.

In the Arno basin rain was also quite exceptional—15% of the average annual rainfall in 24 hours and 25% to 30%—in 48 hours. The level of the Arno reached 11 metres (36 ft.) in Florence as against 7.08 metres (24 ft.) in 1942.

In the Ombrone basin and the neighbouring Grosseto area, rainfall of 268 millimetres (over 10 inches) was recorded at Baetignano as against a previous maximum of 114 millimetres (over 4 inches), and 232 mm at Grosseto as against 103 mm.

When the turbulent, eddying waters became less dangerous, every boat that had escaped damage was mobilized for rescue and relief work in Florence. Roofs of cars, previously totally covered, began to break surface.

Photo © Epoca - Giorgio Lotti, Milan

The floods of November 1966 rendered more catastrophic by the heavy seas and by landslides due to the rapid melting of snow, caused over a hundred deaths, including those of nine of the rescuers. The damage to works of art and to state and private archives is incalculable; material damage is estimated at $2,000 million.

As for agriculture, 310,000 hectares (990,000 acres) of fertile land were inundated, 5,000 kilometres (3,000 miles) of country roads were destroyed or deteriorated, 50,000 cattle were drowned, 12,000 buildings and 16,000 agricultural machines were damaged, 112 agro-industrial plants and over three million quintals (170,000 tons) of fodder were ruined.

Industry counts over 200 damaged factories; thousands of small enterprises had to close down, putting 60,000 out of work. At least 20,000 artisans' workshops and 40,000 shops were damaged.

The damage to public works, the tourist industry, private houses and cars is enormous.

But reconstruction is already in full swing.

The Unesco Courier wishes to thank the Italian Fine Arts and Antiquities Service, Rome, and the following magazines and photo agencies: Epoca (Milan), Rizzoli Press (Milan), ANSA (Rome), Gieffe (Florence), Reporters' Associés (Paris), Europress (Paris) and Roger Viollet (Paris) for their co-operation in the preparation of this special issue.

Splashes and stains mark this fragment of a fresco by Orcagna, the famous 14th century Florentine painter, sculptor and architect. Before the floods, the fragment was preserved near to the "Crucifix" of Cimabue in the museum of Santa Croce. Photo was taken immediately after floods; fragment has since been cleaned.

Photo © Reporters Associés, Paris

TO HELP THE INTERNATIONAL CAMPAIGN FOR FLORENCE AND VENICE...

Send a cheque, made out to "Unesco (Florence-Venice)", to one of the banks listed below with which Unesco has an account.

AUSTRALIA: Commonwealth Trading Bank of Australia, Sydney, N.S.W.
CANADA: The Royal Bank of Canada, Ottawa.
CEYLON: The Chartered Bank, Colombo 1.
DENMARK: Danmarks Nationalbank, Copenhagen K.
FINLAND: Finlands Bank, Helsinki 10.
FRANCE: Société Générale, Agence A.G., Paris-16 (or by transfer to Postal Cheque No. 3-89).
INDIA: The Central Bank of India, Ltd., New Delhi.
JORDAN: The British Bank of the Middle East, Amman.
KENYA: Barclays Bank D.C.O., Nairobi.
LIBERIA: The Bank of Monrovia, Monrovia.
KOREA: The Whasung-Gun Agricultural Corporation, Suwon City.
MALTA: Barclays Bank D.C.O., Valetta.
NIGERIA: Barclays Bank D.C.O., Lagos.
NORWAY: Norges Bank, Oslo.
NETHERLANDS: Amsterdam-Rotterdam Bank NV, The Hague.
NEW ZEALAND: Bank of New Zealand, Wellington, C. 1.
PAKISTAN: State Bank of Pakistan, Karachi.
PHILIPPINES: The First National City Bank of New York, Manila.
SINGAPORE: The Chartered Bank, Singapore 1.
SWEDEN: Stockholms Enskilda Bank, Stockholm.
THAILAND: The Siam Commercial Bank, Bangkok.
TRINIDAD: Barclays Bank D.C.O., San Fernando.
UGANDA: Barclays Bank D.C.O., Kampala.
UNITED ARAB REPUBLIC : National Bank of Egypt, Cairo.
UNITED KINGDOM: Lloyds Bank Europe Limited, London S.W. 1.
UNITED STATES OF AMERICA: The Chase Manhattan Bank, Rockefeller Center Branch, New York.

For additional addresses, see our other language editions

From the Unesco Newsroom...

125,000 U.S.-international educational exchanges

A record total of 125,000 college and university students, teachers and scholars participated in educational exchange programmes between the U.S.A. and 150 other countries in 1965-66, according to "Open Doors 1966", the annual census of the Institute of International Education, New York. Nearly 83,000 students and over 9,000 scholars from overseas studied, taught or did research at U.S. colleges and universities. As in past years, the largest group of students, 23,049, or 35 per cent of all foreign students, came from the Far East.

'En avant' language lessons for Britain's 8-year-olds

Children in over 100 British primary schools are learning French, using a special language course developed for 8 to 11-year-olds by the Nuffield Foundation. Entitled "En avant" (Forward), the course lasts for three years in primary school and two in secondary. Early stages are based on games, acting, cartoons and recordings of songs and conversation in Franch schools. From these oral lessons the course progresses to reading and writing, translations and finally, revision and practice. Experiments in British schools with these methods showed that children learned an average of 500 words a year. In three years they could write and speak simple French without difficulty. Similar courses in Spanish, Russian and German are being tested for introduction in 1967 and 1968.

U.S.S.R. gives 300 books to Unesco Library

Three hundred books and two documentary films have been presented to the Unesco Library by the Soviet National Commission for Unesco on the occasion of Unesco's 20th anniversary. The books consist of Soviet political, scientific and literary works, dictionaries, textbooks on science and education and art albums devoted to major Soviet art galleries. The titles of the documentary films are: "The Road to Science" and "Steps to the World of Beauty".

Small industries, big results

International experience is helping to boost the activity of small industries in Malaysia. In Singapore alone, some 2,000 small enterprises come within the orbit of a programme assisted by the International Labour Organization to expand and improve light industry and thereby create more employment.

Electricity from hot water

A power station operating on hot underground water and designed to supply cheap electricity to a wide area is being built at Makhach Kala, near Baku, in the U.S.S.R. Though not the first station of its type, it is the first to be built outside a volcanic area (where superheated water is found close to the surface). To tap subterranean sources which attain a temperature of 160 degrees C., engineers at Makhach Kala drilled down more than 15,000 feet.

Youth science leaders for Mali

A Unesco-organized training course for youth science leaders was held recently in Bamako, Mali. Lectures and practical work covered optics, astronomy, electricity, radio, aerodynamics and other scientific subjects. Youth leaders who took part will now organize science courses for groups of young people in six regions of Mali.

Record world fish catch

A record catch of 52,400,000 metric tons was made by the world's fishing fleets in 1965, reports the Food and Agriculture Organization. Peru was leading country with 7,400,000 tons, followed by Japan and then, FAO believes, by Mainland China and the Soviet Union. Mr. Oris V. Wells, Deputy Director-General of FAO, recently said that better fishery administration and services were essential if the world's protein diet was to be improved with more fish. Problems of control and rational use occurred because most fish stocks are in international waters.

$2.5 million water project for Istanbul

More than $2.5 million will be spent on a Turkish Government project for the Istanbul region water supply and sewerage system. Istanbul is the largest city in Turkey and its population of 1,600,000 is double that of 25 years ago. Basic services of water and sewage have been unable to keep up with a rapidly expanding demand. Over $1,250,000 has been allocated from U.N. Development Programme funds for the project, scheduled for completion in 1968.

Improving crops in the Mekong Delta

New types of crops would be grown in four Cambodian and ten Vietnamese provinces following the construction of a proposed barrage across the Tonle Sap tributary of the Mekong River in Cambodia, according to a recent report based on the Mekong River Delta Model Study, being made by Unesco with assistance from the U.N. Development Programme. By regularizing the flow of irrigation water, such crops as maize, cotton and tobacco could be added to the region's staple crop of rice. In this Unesco-U.N. study an electronic computer is being used to analyse the hydrological and hydraulic characteristics of the Mekong Delta from Chlong to the Gulf of Thailand and the South China Sea, as well as those of the entire Tonle Sap and Great Lake Basins.

'The school under a tree'

"The school under a tree" is the name given to the literacy campaign that now covers the whole territory of Cameroon. Over 1,700 literacy centres have been set up, attended by over 75,000 people. Two booklets on this four-year campaign have been published, and a monthly journal and weekly broadcasts report its progress.

Television for another African country

The Democratic Republic of the Congo's first television transmitter began operating in Kinshasa, the capital, on November 23.

Nearly 90 countries have issued stamps to commemorate Unesco's 20th anniversary. Above, stamps from Mali, Finland, Mexico and Cambodia. All the Unesco anniversary stamps and first day covers can be obtained from the Unesco Philatelic Service, Place de Fontenoy, Paris 7e.

Technical aid in setting up the service was given by the French state Office de Coopération Radiophonique, which also trained a team of Congolese technicians to run the transmitter.

Library without books

For years past, long lines of students have formed almost every day outside the Hibiya Library in downtown Tokyo. They are not interested in the library's books; they bring their own. They are merely looking for a quiet place to study. Some of the pressure may now be taken off the Hibiya Library with the opening of a study room in a building that formerly housed an Education Research Institute. Reporting the opening of this "library without books", the Japan Times Weekly suggests that the idea might well be copied elsewhere.

New Unesco art slides of Austria's medieval murals

The 24th series in Unesco's Art Slides Collection is devoted to the medieval wall paintings of Austria. It reproduces frescoes dating from the end of the 11th to the end of the 13th centuries, which embellish churches in Carinthia, Styria and the Eastern Tyrol. The series consists of 30 colour slides mounted in cardboard frames, with explanatory notes in English, French and Spanish. Order through Publications Filmées d'Art et d'Histoire, 44 rue du Dragon, Paris 6e (in U.K. from Educational Productions Ltd., East Ardsley, Wakefield, Yorks) or through Unesco's national distributors (see page 43). Price, approximately $10.00 or equivalent.

Preserving the painted tomb of Kazanluk

A Unesco commission has studied preservation problems of a unique Thracian tomb and its mural paintings at Kazanluk, Bulgaria, and reported on its findings to Bulgaria's cultural conservation authorities. The tomb dates from the late 4th or early 3rd century B.C. It is the only tumulus among the thousands dotting the Thracian plain that has been found to contain frescoes which thus constitute a rare document of the art of that period. The Unesco Commission, which went to Kazanluk at Bulgaria's request comprised specialists in physics, chemistry, the history of art and architecture, archaeology and the conservation of paintings and monuments.

World's largest publication lists 500 years of printed books

Publication of the British Museum's general catalogue of printed books —the world's largest single publication to date— has just been completed. The catalogue contains over 4 million entries in 263 large volumes and covers 500 years from the start of printing in Britain to 1955. It has taken nearly seven years to produce, and has now been delivered to libraries in 40 countries.

Peruvian pre-Inca 'fardo' presented to Unesco

A Peruvian *fardo* —a mummy seven centuries old— offered to Unesco on its 20th anniversary by the Peruvian Government, was unwrapped recently before television cameras at the Natural History Museum in Paris. The *fardo* had been discovered at Puruchoco, a pre-Inca site near Lima, by Professor Arturo Jimenez Borja, director of Peru's archaeological site museums. The *fardo*, believed to be the first of its kind to arrive in Europe intact, contained the bones of a young Indian boy who died in the 13th century, and a collection of toys, a whip, a catapult, a spinning top, and clothes made from delicately woven material. The burial objects were all in a perfect state of preservation.

African music on records

The first four discs are on sale of a Unesco Collection of recordings entitled "An Anthology of African Music", produced for the International Music Council by the International Institute of Comparative Music Studies and Documentation. The first disc is devoted to the music of the Dan, a people living in the Ivory Coast and Liberia. The second consists of vocal and instrumental music from Rwanda: among instruments included are drums, table-zither, vertical flute, musical bow, trumpets, horn and a kind of fiddle. The third disc offers a selection of the music of the Pygmees who inhabit the vast equatorial forest zone in the south west of the Central African Republic. The last disc is devoted to Ethiopia, where the liturgical music of the Coptic Church has remained unchanged since the beginning of the Christian era. (Order from Le Chant du Monde, 32 Rue Beaujon, Paris 8e; price: 38,55 Frs per disc.)

Flashes ...

■ *A plan to double Nigeria's agricultural production by 1980 is outlined in a special report just published by FAO. The population of Nigeria (Africa's most populous country: 56 million people in 1963) is expected to reach 86 million by 1980.*

■ *The Unesco Executive Board has approved an agreement between Unesco and the Inter-American Development Bank "to join efforts in activities designed to promote education in Latin America, particularly higher, technical and vocational education."*

■ *The U.S.A. is joining two Unesco international agreements to promote the free flow of educational, scientific and cultural materials.*

■ *Mexico's education budget for 1965-1966 (about 400 million dollars) represents 26 % of the national budget. It is the top item in the budget and twice as much as is spent on the army.*

■ *Over the past century mankind has doubled its numbers, but in the same period the world's city population has increased 10 or 11 times. Today one person out of three lives in a town.*

BOOKSHELF

RECENT U.N. BOOKS

■ **World Population: Challenge to Development**
Highlights of the 1965 World Population Conference, Belgrade, 1966 ($0.75).

■ **World Population Prospects**
(Population Studies No. 41). U.N. Dept. of Economic and Social Affairs, 1966 ($2.00 or equivalent).

■ **Yearbook of the United Nations 1964**
U.N. Office of Public Information, New York, 1966 ($16.50 or equivalent).

■ **Apartheid in South Africa**
(Extracts from the report of the U.N. Special Committee on Apartheid). U.N. Office of Public Information, 1966 ($0.30 or equivalent).

■ **Yearbook of International Trade Statistics 1964**
U.N. Dept of Economic and Social Affairs, 1966 ($11.50 or equivalent).

U.N. Publications can be ordered through bookstores or from United Nations, Sales Section, New York or Geneva.

UNESCO BOOKS

■ **Evaluating Development Projects**
Prepared for Unesco by Samuel P. Hayes, Jr. (Technology and Society series). Revised edition (1966) of "Measuring the Results of Development Projects", ($2.50, 13/- stg., 9 F).

■ **The Planning and Organization of Adult Literacy Programmes in Africa**
By Peter du Sautoy. (Manuals on Adult and Youth Education) 1966 ($1.50, 8/- stg., 5.50 F).

■ **International Yearbook of Education. Vol. XXVII, 1965**
Co-edition: International Bureau of Education, Geneva-Unesco, Paris, 1966 ($9.50, 48/- stg., 33 F).

■ **Source Book for Geography Teaching**
Co-edition: Longmans, Green and Co., London-Unesco, Paris 1965 ($3.50, 16/- stg., 11.50 F).

■ **Access to Higher Education Vol. II**
(The Development of Higher Education series). Co-edition: The International Association of Universities, Paris-Unesco, Paris, 1965 ($9.50, 48/- stg., 33 F).

★

■ **Science Year: The World Book Science Annual 1966**
Field Enterprises Educational Corporation, Chicago, U.S.A. ($5.95).

■ **Educreation**
(Education for creation, growth and change). By Paul Ritter. Commonwealth and International Library, Pergamon Press, 1966 (30/- stg.).

■ **Gitanjali (Song Offering)**
By Rabindranath Tagore. Prose translations by the author from the original Bengali. Macmillan's Pocket Library, 1965 (8/6 stg.).

Letters to the Editor

MEMORABLE ANNIVERSARIES OF 1967

Sir,

For two countries 1967 will be a memorable anniversary year. The Soviet Union will celebrate the 50th anniversary of its revolution. My country, Canada, will commemorate the centenary of its confederation. Its most ambitious celebration will be the Universal and International Exhibition, Expo 67, held in Montreal.

You thus have an appropriate occasion to devote two issues, though not necessarily exclusively, to these countries.

Expo 67's theme will be "Man and his World". The time would thus be ripe for you to open your "window" on the "world" created for Expo 67 on a complex of mainly man-made islands in the St. Lawrence River. Open it, in fact, on the whole of Canada which, as far as I know, is only mentioned in your excellent magazine in the context of perpetual statistics.

Yves Daoust
Masson, Quebec, Canada

ARTIFICIAL GRAVITY FOR SPACE CREWS

Sir,

Your issue on Man and Space (May 1966) stated that artificial gravity would be provided for crews of future space stations placed in orbit around the earth. How can this be done?

Hassissene Mokhtar
Benjaia, Algeria

One way to protect astronauts from possible ill effects produced by long exposure to conditions of weightlessness would be to spin the space station on its own orbit. The centrifugal force thus created would produce the same effect as gravity. Thanks to this "artificial gravity," astronauts and unsecured objects would no longer float freely inside the space platform—Editor.

NEVER TOO OLD TO LEARN

Sir,

I have on my shelf Volumes I and II of the Unesco-sponsored History of Mankind. The immensity of information in these volumes offers me many occasions to compose popular lectures for my old audience here in our Home. You might think that we do not like history (80 % of us are over 80), but you are wrong. We are still full of life. I myself have "come of age" four times (21 times 4 equals 84).

My knowledge of languages comprises English, German, French, Spanish, Italian, High Dutch and Afrikaans, and I subscribe to the English and Spanish editions of the Unesco Courier.

On reading your wonderful issue on Unesco's first twenty years (July-August 1966) I learned that Unesco's biggest single best-seller is the Unesco Source Book for Science Teaching—400,000 copies sold to date in 22 languages. I do not know what is in it, but 400,000 readers cannot go wrong. There must be lots of stuff to tickle even the oldest fancies and imaginations.

I cannot put down in adequate words how rich, how happy I feel NOT to be illiterate. I am getting a little stiff already, but still I will plunge into Science like a retrieving dog into water.

C. van Beest
Old Age Home
Uitenhage, South Africa

POEMS OF JAIME TORRES BODET

Sir,

Your "Bookshelf" (April 1966) lists works from Unesco's Translations Series including my own book, *Selected Poems of Jaime Torres Bodet*, which you say is a bilingual volume of 44 works by the celebrated Mexican poet and educator. But my name as the translator and as the person who wrote the critical introduction is not given. May I ask you to correct this omission.

Sonja P. Karsen
Saratoga Springs, N.Y., U.S.A.

ROLL-CALL FOR BAGPIPES

Sir,

I am working on a study of the *gaita* (the traditional instrument of Galicia, Spain) and its counterparts elsewhere in Europe. The best known of these ancient instruments are the bagpipe (Scotland), the *biniou* (Brittany) and the *gaita* itself (Galicia and Asturias). Other members of the family include the *beceo polaci* (Central and Northern Italy), *boccfeife and dudelsack* (Germany), *cornemuse* (Flanders), *cabrette* (Auvergne, France), cornamusa (Catalonia), *xirimia* (Majorca), *corobout* (Brittany), *hornpipe* (England), *zampogna* (Abruzzi and Calabria, Italy), *gaida* (Bulgaria).

I have been unable to find a bibliography on the subject and so I would be glad to receive information on the instruments named above and on any similar ones, particularly their shape, the materials used to make them, their ornamentation, tonality and scale, and how many drones (pipes producing a fixed continuous note) are fitted. Photographs and historical and iconographical data would also be welcomed as well as details of typical pieces of "bagpipe music".

Jesús Díaz García
Paseo del Marqués de Zafra 2,
Piso 40, D, Madrid 2, Spain

ANOTHER MAGIC SQUARE

Sir,

The arrangement of numbers in Albrecht Dürer's "magic square" (Unesco Courier, June 1966) is not the only one which produces 34 when the numbers are added up by rows, diagonals or columns. Here is another one:

16	2	3	13
5	8	11	10
12	9	6	7
1	15	14	4

Other features of this version are:

- Numbers in the corner squares also total 34.
- Numbers in the top and bottom squares of each colums always total 17, i.e. half of 34 (16 + 1, 2 + 15, etc.).
- Numbers in the inner squares of each column thus also add up to 17 (5 + 12, 8 + 9, etc.).

Paul Slosse
Uccle-Brussels, Belgium

STUDENT SERVICE ABROAD

Sir,

I am very glad to endorse the Unesco Courier. It is unbiased and therefore doing good work by giving fair opinions of the views of different nations. I was a little disappointed, however, that no mention was made of the Canadian University Service Overseas in the article on youth organizations (July-August 1965). Of course it is small compared to the U.S. Peace Corps. It was formed shortly before the Peace Corps and is a private organization. The young people are paid by the country in which they work. The son of a friend of mine is in Ghana and is giving most of his salary to help the boys he teaches to continue their education.

K.M. Tempest
Calgary, Alberta, Canada

GREAT AUTHOR OF THE MONTH

Sir,

The article on Natsume Soseki, the most popular writer in Japan (October 1966); was particularly inspiring. Why not put aside a page or two in each issue for an article on a great writer? I am sure it would be of great value to all those readers who, like me, are perhaps not so well acquainted with the world's many great writers.

P.R. Reeves
Yeovil, Somerset, U.K.

Imp. GEORGES LANG, PARIS. IMPRIME EN FRANCE. — D.L. 4e trimestre 1966. — C. N° 1

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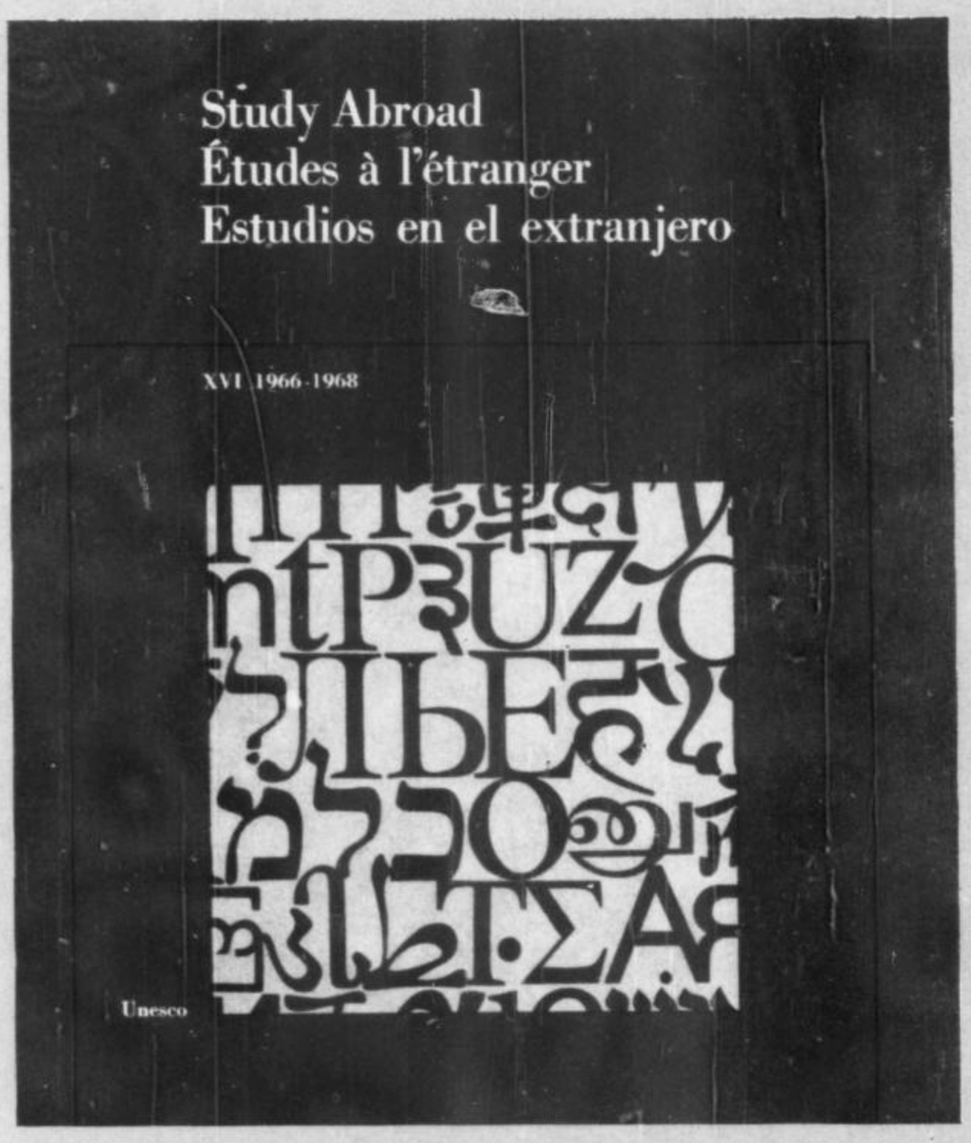

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Oh Venice! Venice! when thy marble walls
Are level with the waters, there shall be
A cry of nations o'er thy sunken halls,
A loud lament along the sweeping sea!

BYRON

" Ode on Venice "

Photo © Associated Press

VENICE'S SUNKEN HALLS

Floods, caused by a tidal surge in the northern Adriatic lashed by violent gales, invaded Venice in November 1966, damaging and defacing monuments and historic buildings. The buildings in Venice stand on piles driven into the bed of an Adriatic lagoon, and the city is slowly sinking, dragged down by subsidence of the lagoon bed. The recent floods—the worst for 200 years—reveal the vulnerability of this ancient island city and the urgent need for protective action. Here, tidal waters beat against the columns of the Doge's palace.